

SOCIAL ASSESSMENT

BASELINE SCOPING REPORT

MERINO WIND ENERGY FACILITY

NORTHERN CAPE PROVINCE

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Prepared

By

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EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

Savannah Environmental was appointed to manage the Environmental Impact Assessment (EIA) process for the proposed 140 MW Merino Wind Energy Facility (WEF) located approximately 30-35 km west of the town of Richmond in the Northern Cape Province. A Battery Energy Storage System (BESS) will be attached to the WEF. The project site is situated within the Ubuntu Local Municipality (ULM), which is located within the Pixley Ka Seme District Municipality (PKSDM). The Merino WEF is one of two WEF and three 100 MW PV Solar Energy Facilities (SEFs) proposed in the area and referred to as the Great Karoo Renewable Energy (GKRE) cluster.

Tony Barbour Environmental Consulting was appointed to undertake a specialist Social Impact Assessment (SIA) as part of an EIA process. This report contains the findings of the Scoping Level SIA for the proposed WEF.

SUMMARY OF KEY FINDINGS

The key findings of the study are summarised under the following sections:

- Fit with policy and planning.
- Construction phase impacts.
- Operational phase impacts.
- Cumulative impacts.
- Decommissioning phase impacts.
- No-development option.

The findings of the Social Baseline Scoping Report are based on a review of relevant documents and the authors experience with undertaking SIAs for a number of renewable energy projects located in the Northern Cape Province. The issues will be confirmed and assessed during the Assessment Phase of the EIA process.

POLICY AND PLANNING ISSUES

The development of renewable energy is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The PKSDM SDF and IDP and ULM IDP also support the development of renewable energy. The development of the proposed WEF is therefore supported by key policy and planning documents.

CONSTRUCTION PHASE

The key social issues associated with the construction phase include:

Potential positive impacts

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of jobseekers.
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
- Increased risk of grass fires associated with construction related activities.
- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
- Impact on productive farmland.

OPERATIONAL PHASE

The following key social issues are of relevance to the operational phase:

Potential positive impacts

- The establishment of infrastructure to improve energy security and support renewable sector.
- Creation of employment opportunities.
- Benefits for local landowners.
- Benefits associated with socio-economic contributions to community development.

Potential negative impacts

- Noise impacts associated with the operation of the plant.
- Visual impacts and associated impacts on sense of place.
- Potential impact on property values.
- Potential impact on tourism.

CUMULATIVE IMPACTS

The cumulative impacts include:

- Cumulative impact on sense of place.
- Cumulative impact on local services and accommodation.
- Cumulative impact on local economy.

NO-DEVELOPMENT OPTION

The No-Development option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with clean, renewable energy. Given South Africa's current energy security challenges and its position as one of the highest per capita producers of carbon emissions in the world, this would represent a significant negative social cost.

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CONTENTS OF THE SPECIALIST REPORT – CHECKLIST

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a <i>curriculum vitae</i> ;	Section 1.6, Annexure C
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Section 1.7, Annexure D
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1, Section 1.2
(cA) an indication of the quality and age of base data used for the specialist report;	Section 1.2, Section 3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 4
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A for SIA
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 1.2, Annexure B
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 4, Section 5
(g) an identification of any areas to be avoided, including buffers;	N/A
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 3
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.5
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment, or activities;	Section 4, Section 5,
(k) any mitigation measures for inclusion in the EMPr;	Section 4
(l) any conditions for inclusion in the environmental authorisation;	Section 4, Section 5
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
(n) a reasoned opinion— i. as to whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr or Environmental Authorization, and where applicable, the closure plan;	Section 5.3
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	To be undertaken during Assessment Phase
(p) any other information requested by the competent authority	N/A
Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	

ACRONYMS

BESS	Battery Energy Storage System
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DM	District Municipality
HD	Historically Disadvantaged
EIA	Environmental Impact Assessment
ULM	Ubuntu Local Municipality
IDP	Integrated Development Plan
IPP	Independent Power Producer
PKSDM	Pixley Ka Seme District Municipality
kV	Kilovolts
LED	Local Economic Development
LM	Local Municipality
NC	Northern Cape
NCPPGDS	Northern Cape Province Provincial Growth and Development Strategy
NCSDF	Northern Cape Spatial Development Framework
MW	Megawatt
PGDS	Provincial Growth and Development Strategy
SDF	Spatial Development Framework
WEF	Wind Energy Facility
SIA	Social Impact Assessment

SECTION 1: INTRODUCTION

1.1 INTRODUCTION

Savannah Environmental was appointed to manage the Environmental Impact Assessment (EIA) process for the proposed 140 MW Merino Wind Energy Facility (WEF) located approximately 30-35 km west of the town of Richmond in the Northern Cape Province. A Battery Energy Storage System (BESS) will be attached to the WEF. The project site is situated within the Ubuntu Local Municipality (ULM), which is located within the Pixley Ka Seme District Municipality (PKSDM). The Merino WEF is one of two WEF and three 100 MW PV Solar Energy Facilities (SEFs) proposed in the area and referred to as the Great Karoo Renewable Energy (GKRE) cluster (Figure 1.1).

Tony Barbour Environmental Consulting was appointed to undertake a specialist Social Impact Assessment (SIA) as part of an EIA process. This report contains the findings of the Scoping Level SIA for the proposed WEF.



Figure 1.1: Location of Great Karoo Renewable Energy Cluster (Red Arrow)

1.2 TERMS OF REFERENCE

The terms of reference for the Scoping Level SIA require:

- A description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed development.
- A description and initial assessment of the potential social issues associated with the proposed development.

- Identification of potential enhancement and mitigation aimed at maximising opportunities and avoiding and or reducing negative impacts.

The impacts and associated significance ratings will be confirmed during the Assessment Phase.

1.3 PROJECT DESCRIPTION

A wind energy facility (WEF) consists of multiple wind turbines which are used to capture the kinetic energy of the wind and generate electricity. This captured kinetic energy is used to drive a generator located within the wind turbine and the energy is subsequently converted into electrical energy. A typical wind turbine consists of four primary components (Figure 1.2).

- The **foundation unit** upon which the turbine is anchored to the ground. The area required for the concrete foundation is typically in the region of $\sim 200 \text{ m}^2$.
- The **tower**, which is a hollow structure allowing access to the nacelle. The height of the tower is a key factor in determining the amount of electricity a turbine can generate. The tower houses the transformer which converts the electricity to the correct voltage for transmission into the grid. The transformer can also be placed in a small housing outside the tower depending on the design.
- The **nacelle** (generator/turbine housing). The nacelle houses the gearbox and generator as well as a wind sensor to identify wind direction. The nacelle turns automatically ensuring the blades always face into the wind to maximise the amount of electricity generated.
- The **rotor**, which is typically comprised of three rotor blades with a diameter varying between 100 and 200 m. The rotor blades use the latest advances in aeronautical engineering materials science to maximise efficiency. The greater the number of turns of the rotor the more electricity is produced.

The amount of energy a turbine can harness is dependent on the wind velocity and the length of the rotor blades. Wind turbines typically start generating power at wind speeds of between 10 - 15 km/hour, with speeds between 45 - 60 km/hour required for full power operation. In a situation where wind speeds are excessive, the turbine automatically shuts down to prevent damage. A turbine is designed to operate continuously, unattended and with low maintenance for more than 20 years or >120 000 hours of operation. Once operating, a WEF can be monitored and controlled remotely, with a mobile team used for maintenance, when required.

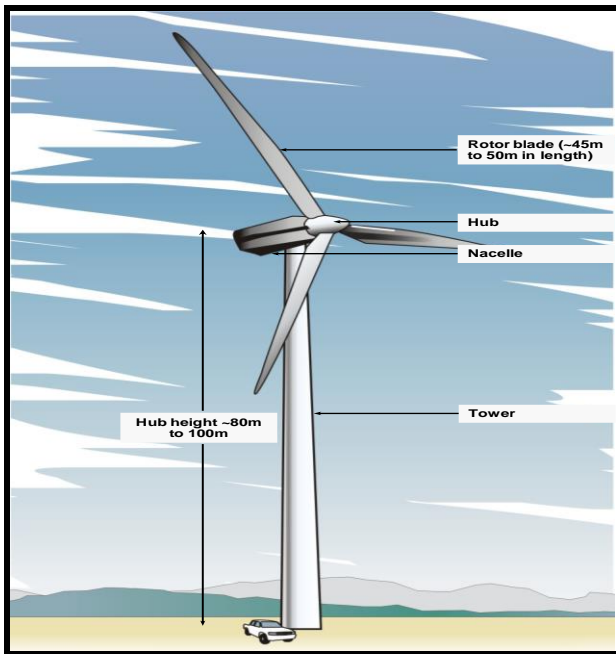


Figure 1.2: Typical example of wind turbine structure and components

The proposed Merino WEF and associated infrastructure includes the following components:

- Up to 30 wind turbine generators (WTGs) with a maximum generation capacity of up to 140MW.
- Turbines with a hub height of up to 200m and a rotor diameter of up to 200m.
- Hardstand areas of approximately 1 500m² per turbine.
- Temporary construction laydown and storage area of approximately 4 500m² per turbine.
- Medium voltage cabling connecting the turbines will be laid underground.
- Internal roads with a width of up to 10m providing access to each turbine and accommodating cable trenches and stormwater channels, as required. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary.
- A temporary construction laydown/staging area of approximately 22 500m² which will also accommodate the operation and maintenance (O&M) buildings.

The BESS associated with each 140 MW WEF will occupy approximately 1 ha (Photograph 1.1).



Photograph 1.1: Example of BESS located in storage containers

1.4 APPROACH TO STUDY

The approach to the Scoping Level SIA study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). These guidelines are based on international best practice. The key activities in the SIA process embodied in the guidelines include:

- Describing and obtaining an understanding of the proposed intervention (type, scale, and location), the settlements, and communities likely to be affected by the proposed project.
- Collecting baseline data on the current social and economic environment.
- Identifying the key potential social issues associated with the proposed project. This requires a site visit to the area and consultation with affected individuals and communities. As part of the process a basic information document was prepared and made available to key interested and affected parties. The aim of the document was to inform the affected parties of the nature and activities associated with the construction and operation of the proposed development to enable them to better understand and comment on the potential social issues and impacts.
- Assessing and documenting the significance of social impacts associated with the proposed intervention.
- Identifying alternatives and mitigation measures.

In this regard the study involved:

- Review of socio-economic data for the study area.
- Review of relevant planning and policy frameworks for the area.
- Review of information from similar studies, including the SIAs undertaken for other renewable energy projects.
- Identification and assessment of the social issues associated with the proposed project.

A site visit will be undertaken during the Assessment Phase of the SIA. The site visit will include interviews with interested and affected parties. Annexure A contains a list of the secondary information reviewed. Annexure B summarises the assessment methodology used to assign significance ratings to the assessment process.

1.5 ASSUMPTIONS AND LIMITATIONS

1.5.1 Assumptions

Identification of social issues

As indicated above, a site visit will be undertaken during the Assessment Phase of the SIA. The identification of social issues is based on the authors experience with undertaking in the region of 130 SIAs for solar and wind energy facilities and the associated infrastructure (substations, transmission lines, roads etc.). Based on this the author is confident that the majority of social issues have been identified.

Technical suitability

It is assumed that the development site represents a technically suitable site for the establishment of the proposed WEF and associated infrastructure.

Strategic importance of the project

The strategic importance of promoting renewable and other forms of energy is supported by the national and provincial energy policies.

Fit with planning and policy requirements

Legislation and policies reflect societal norms and values. The legislative and policy context therefore plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard, a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines contained in the relevant legislation and planning documents, and there are no significant or unique opportunities created by the development, the development cannot be supported.

1.5.2 Limitations

Demographic data

Some of the provincial documents do not contain data from the 2011 Census and or 2016 Household Community Survey. However, where required the relevant 2011 and 2016 data has been provided.

Site visit

A site visit will be undertaken during the Assessment Phase of the SIA. The site visit will include interviews with interested and affected parties. However, as indicated above, the author is confident that the majority of social issues have been identified.

1.6 SPECIALIST DETAILS

Tony Barbour is an independent specialist with 26 years' experience in the field of environmental management. In terms of SIA experience Tony Barbour has undertaken in the region of 260 SIA's and is the author of the Guidelines for Social Impact Assessments for EIA's adopted by the Department of Environmental Affairs and Development Planning (DEA&DP) in the Western Cape in 2007. Annexure C contains a copy of CV for Tony Barbour.

1.7 DECLARATION OF INDEPENDENCE

This confirms that Tony Barbour, the specialist consultant responsible for undertaking the study and preparing the Scoping Level SIA Report, is independent and does not have a vested or financial interest in the proposed development being either approved or rejected. Annexure D contains a copy of signed declaration of independence.

1.8 REPORT STRUCTURE

The report is divided into four sections, namely:

- Section 1: Introduction
- Section 2: Summary of key policy and planning documents relating to renewable energy and the area in question
- Section 3: Overview of the study area
- Section 4: Identification and assessment of key social issues

SECTION 2: POLICY AND PLANNING ENVIRONMENT

2.1 INTRODUCTION

Legislation and policy embody and reflect key societal norms, values and developmental goals. The legislative and policy context therefore plays an important role in identifying, assessing, and evaluating the significance of potential social impacts associated with any given proposed development. An assessment of the “policy and planning fit¹” of the proposed development therefore constitutes a key aspect of the Social Impact Assessment (SIA). In this regard, assessment of “planning fit” conforms to international best practice for conducting SIAs.

Section 2 provides an overview of the policy and planning environment affecting the proposed project. For the purposes of meeting the objectives of the SIA the following policy and planning documents were reviewed:

- The National Energy Act (2008).
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998).
- The White Paper on Renewable Energy (November 2003).
- Integrated Resource Plan (IRP) for South Africa (2010-2030).
- The National Development Plan (2011).
- Northern Cape Provincial Growth and Development Strategy (2004-2014).
- Northern Cape Climate Change Response Strategy.
- Northern Cape Spatial Development Framework (2012).
- Northern Cape Province Green Document (2017/2018).
- Pixley ka Seme District Municipality Integrated Development Plan (2019-2020).
- Pixley ka Seme District Municipality Spatial Development Framework (2017).
- Ubuntu Local Municipality Integrated Development Plan (2019-2020).

Section 2 also provides a review of the Renewable Energy Programme in South Africa and a summary of some of the key social issues associated with wind farms based on international experience. A summary of a review of international studies on the potential impacts on property values and tourism is also provided.

2.2 NATIONAL POLICY ENVIRONMENT

2.2.1 National Energy Act (Act No 34 of 2008)

The National Energy Act was promulgated in 2008 (Act No 34 of 2008). One of the objectives of the Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including solar and wind:

“To ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements (...);

¹ Planning fit” can simply be described as the extent to which any relevant development satisfies the core criteria of appropriateness, need, and desirability, as defined or circumscribed by the relevant applicable legislation and policy documents at a given time.

to provide for (...) increased generation and consumption of renewable energies..."(Preamble).

2.2.2 White Paper on the Energy Policy of the Republic of South Africa

Investment in renewable energy initiatives, such as the proposed WEF, is supported by the White Paper on Energy Policy for South Africa (December 1998). In this regard, the document notes:

"Government policy is based on an understanding that renewables are energy sources in their own right, are not limited to small-scale and remote applications, and have significant medium and long-term commercial potential".

"Renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future".

The support for renewable energy policy is guided by a rationale that South Africa has a very attractive range of renewable resources, particularly **solar** and wind and that renewable applications are in fact the least cost energy service in many cases; more so when social and environmental costs are taken into account.

Government policy on renewable energy is thus concerned with meeting the following challenges:

- Ensuring that economically feasible technologies and applications are implemented.
- Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential, and compared to investments in other energy supply options; and,
- Addressing constraints on the development of the renewable industry.

The White Paper also acknowledges that South Africa has neglected the development and implementation of renewable energy applications, despite the fact that the country's renewable energy resource base is extensive, and many appropriate applications exist.

The White Paper also notes that renewable energy applications have specific characteristics that need to be considered. Advantages include:

- Minimal environmental impacts in operation in comparison with traditional supply technologies; and
- Generally lower running costs, and high labour intensities.

Disadvantages include:

- Higher capital costs in some cases.
- Lower energy densities.
- Lower levels of availability, depending on specific conditions, especially with sun and wind-based systems.

2.2.3 White Paper on Renewable Energy

The White Paper on Renewable Energy (November, 2003) (further referred to as the White Paper) supplements the *White Paper on Energy Policy*, which recognizes that the medium and long-term potential of renewable energy is significant. This Paper sets out

Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa.

The White Paper notes that while South Africa is well endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. As signatory to the Kyoto Protocol², Government is determined to make good the country's commitment to reducing greenhouse gas emissions. To this purpose, Government has committed itself to the development of a framework in which a national renewable energy framework can be established and operate.

South Africa is also a signatory of the Copenhagen Accord, a document that delegates at the 15th session of the Conference of Parties (COP 15) to the United Nations Framework Convention on Climate Change agreed to "take note of" at the final plenary on 18 December 2009. The accord endorses the continuation of the Kyoto Protocol and confirms that climate change is one of the greatest challenges facing the world. In terms of the accord South Africa committed itself to a reduction target of 34% compared to business as usual. In this regard, the IRP 2010 aims to allocate 43% of new energy generation facilities in South Africa to renewables.

Apart from the reduction of greenhouse gas emissions, the promotion of renewable energy sources is aimed at ensuring energy security through the diversification of supply (in this regard, also refer to the objectives of the National Energy Act).

Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels.

2.2.4 Integrated Energy Plan (2016)

The development of a National Integrated Energy Plan (IEP) was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008 (Act No. 34 of 2008), the Minister of Energy is mandated to develop and, on an annual basis, review and publish the IEP in the Government Gazette. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development.

The IEP notes that South Africa needs to grow its energy supply to support economic expansion and in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight key objectives were identified, namely:

- Objective 1: Ensure security of supply.

² The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC), aimed at fighting global warming. The UNFCCC is an international environmental treaty with the goal of achieving "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". The Protocol was initially adopted on 11 December 1997 in Kyoto, Japan and entered into force on 16 February 2005. As of November 2009, 187 states have signed and ratified the protocol (Wikipedia).

- Objective 2: Minimise the cost of energy.
- Objective 3: Promote the creation of jobs and localisation.
- Objective 4: Minimise negative environmental impacts from the energy sector.
- Objective 5: Promote the conservation of water.
- Objective 6: Diversify supply sources and primary sources of energy.
- Objective 7: Promote energy efficiency in the economy.
- Objective 8: Increase access to modern energy.

The IEP provides an assessment of current energy consumption trends within different sectors of the economy (i.e. agriculture, commerce, industry, residential and transport) and uses this information to identify future energy requirements, based on different scenarios. The scenarios are informed by different assumptions on economic development and the structure of the economy and also take into account the impact of key policies such as environmental policies, energy efficiency policies, transport policies and industrial policies, amongst others.

Based on this information the IEP then determines the optimal mix of energy sources and technologies to meet those energy needs in the most cost-effective manner for each of the scenarios. The associated environmental impacts, socio-economic benefits and macroeconomic impacts are also analysed. The IEP is therefore focused on determining the long-term energy pathway for South Africa, taking into account a multitude of factors which are embedded in the eight objectives.

As part of the analysis four key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios:

- The Base Case Scenario assumes that existing policies are implemented and will continue to shape the energy sector landscape going forward. It assumes moderate economic growth in the medium to long term;
- The Environmental Awareness Scenario is characterised by more stringent emission limits and a more environmentally aware society, where a higher cost is placed on externalities caused by the supply of energy;
- The Resource Constrained Scenario in which global energy commodity prices (i.e. coal, crude oil and natural gas) are high due to limited supply;
- The Green Shoots Scenario describes an economy in which the targets for high economic growth and structural changes to the economy, as set out in the National Development Plan (NDP), are met.

The IEP notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of renewable energy the document refers to wind and solar energy. The document does however appear to support solar over wind noting that solar PV and CSP with storage present excellent opportunities to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Solar technologies also present the greatest potential for job creation and localisation. Incentive programmes and special focused programmes to promote further development in the technology, as well as solar roll-out programmes, should be pursued.

In terms of existing electricity generation capacity, the IEP indicates that existing capacity starts to decline notably from 2025, with significant plant retirement occurring in 2031, 2041 and 2048. By 2050 only 20% of the current electricity generation capacity remains. As a result, large investments are required in the electricity sector in order to maintain an adequate supply in support of economic growth.

By 2020, various import options become available, and some new coal capacity is added along with new wind, solar and gas capacity. The mix of generation capacity technologies by 2050 is considerably more diverse than the current energy mix, across all scenarios. The main differentiating factors between the scenarios are the level of demand, constraints on emission limits and the carbon dioxide externality costs.

In all scenarios the energy mix for electricity generation becomes more diverse over the period to 2050, with coal reducing its share from about 85% in 2015 to 15–20% in 2050 (depending on the scenario). Solar, wind, nuclear, gas and electricity imports increase their share. The Environmental Awareness and Green Shoots scenarios take on higher levels of renewable energy.

An assessment of each scenario against the eight objectives with reference to renewable energy notes while all scenarios seek to ensure that costs are minimised within the constraints and parameters of each scenario, the Base Case Scenario presents the least cost followed by the Environmental Awareness, Resource Constrained and Green Shoots scenarios respectively when total energy system costs are considered.

In terms of promoting job creation and localisation potential, the Base Case Scenario presents the greatest job creation potential, followed by the Resource Constrained, Environmental Awareness and Green Shoots scenarios respectively. In all scenarios, approximately 85% of total jobs are localisable. For electricity generation, most jobs result from solar technologies followed by nuclear and wind, with natural gas and coal making a smaller contribution.

The Environmental Awareness Scenario, due to its stringent emission constraints, shows the lowest level of total emissions over the planning horizon. This is followed by the Green Shoots, Resource Constrained and Base Case scenarios. These trends are similar when emissions are considered cumulatively and individually by type.

The IEP notes that a diversified energy mix with a reduced reliance on a single or a few primary energy sources should be pursued. In terms of renewable energy, wind and solar are identified as the key options.

Wind

Wind energy should continue to play a role in the generation of electricity. Allocations to ensure the development of wind energy projects aligned with the IRP2010 should continue to be pursued.

Solar

- Solar should play a much more significant role in the electricity generation mix than it has done historically and constitutes the greatest share of primary energy (in terms of total installed capacity) by 2050. The contribution of solar in the energy mix comprises both CSP and solar PV.
- Investments should be made to upgrade the grid in order to accommodate increasing solar and other renewable energy contributions.

With reference to the Renewable Energy Independent Power Producer (REIPP) Procurement Programme, the IEP notes:

- The REIPP Procurement Programme should be extended, and new capacity should be allocated through additional bidding windows in order ensure the ongoing deployment of renewable energy technologies.

- Experience and insights gained from the current procurement process should be used to streamline and simplify the process.
- The implementation of REIPP projects in subsequent cycles of the programme should be aligned with the spatial priorities of provincial and local government structures in the regions that are selected for implementation, in line with the Spatial Development Frameworks. This will ensure that there is long-term, sustainable infrastructure investment in the areas where REIPP projects are located. Such infrastructure includes bulk infrastructure and associated social infrastructure (e.g. education and health systems). This alignment will further assist in supporting the sustainable development objectives of provincial and local government by benefiting local communities.

The IEP indicates that Renewable Energy Development Zones (REDZs) have been identified and describe geographical areas:

- In which clusters (several projects) of wind and solar PV development will have the lowest negative impact on the environment while yielding the highest possible social and economic benefit to the country.
- That are widely agreed to have strategic importance for wind and solar PV development.
- Where the environmental and other authorisation processes have been aligned and streamlined based on scoping level pre-assessments and clear development requirements.
- Where proactive and socialised investment can be made to provide time-efficient infrastructure access.

2.2.5 Integrated Resource Plan

The integrated resource plan (IRP) is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. On 6 May 2011, the Department of Energy (DoE) released the Integrated Resource Plan 2010-2030 (IRP 2010) in respect of South Africa's forecast energy demand for the 20-year period from 2010 to 2030. The IRP 2010 was intended to be a 'living plan' that would be periodically revised by the DoE. However, this was never done and resulted in an energy mix that failed to adequately meet the constantly changing supply and demand scenarios in South Africa, nor did it reflect global technological advancements in the efficient and responsible generation of energy.

On 27 August 2018, the then Minister of Energy published a draft IRP which was issued for public comment (Draft IRP). Following a lengthy public participation and consultation process the Integrated Resource Plan 2019 (IRP 2019) was gazetted by the Minister of Mineral Resources and Energy, Gwede Mantashe, on 18 October 2019, updating the energy forecast for South Africa from the current period to the year 2030. The IRP is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost.

Since the promulgated IRP 2010, the following capacity developments have taken place. A total 6 422MW under the government led Renewable Energy Independent Power Producers Programme (RE IPP Procurement Programme) has been procured, with 3 876MW currently operational and made available to the grid. In addition, IPPs have commissioned 1 005MW from two Open Cycle Gas Turbine (OCGT) peaking plants. Under the Eskom build programme, the following capacity has been commissioned: 1 332MW of Ingula pumped storage, 1 588MW of Medupi, 800MW of

Kusile and 100MW of Sere Wind Farm. In total, 18 000MW of new generation capacity has been committed to.

Provision has been made for the following new additional capacity by 2030:

- 1 500MW of coal.
- 2 500MW of hydro.
- 6 000MW of solar PV.
- 14 400MW of wind.
- 1 860MW of nuclear.
- 2 088MW for storage.
- 3 000MW of gas/diesel.
- 4 000MW from other distributed generation, co-generation, biomass and landfill technologies.

Figure 2.1 provides a summary of the allocations and commitments between the various energy sectors.

	Coal	Coal (Decommissioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)
Current Base	37,149		1 860	2,100	2 912	1 474	1 980	300	3 830	499
2019	2,155	-2,373					244	300		Allocation to the extent of the short term capacity and energy gap.
2020	1,433	-557				114	300			
2021	1,433	-1403				300	818			
2022	711	-844			513	400	1,000	1,600		
2023	750	-555				1000	1,600		500	
2024			1,860				1,600	1000	500	
2025						1000	1,600		500	
2026		-1,219					1,600		500	
2027	750	-847					1,600	2000	500	
2028		-475				1000	1,600		500	
2029		-1,694			1575	1000	1,600		500	
2030		-1,050		2,500		1000	1,600		500	
TOTAL INSTALLED CAPACITY by 2030 (MW)	33,364		1,860	4,600	5,000	8,288	17,742	600	6,380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2*	6.3	17.8	0.6	1.3	

<ul style="list-style-type: none"> Installed Capacity Committed/Already Contracted Capacity Capacity Decommissioned New Additional Capacity Extension of Koeberg Plant Design Life Includes Distributed Generation Capacity for own use 	<ul style="list-style-type: none"> 2030 Coal Installed Capacity is less capacity decommissioned between years 2020 and 2030. Koeberg power station rated/installed capacity will revert to 1,926MW (original design capacity) following design life extension work. Other/ Distributed generation includes all generation facilities in circumstances in which the facility is operated solely to supply electricity to an end-use customer within the same property with the facility. Short term capacity gap is estimated at 2,000MW.
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Figure 2.1: Summary of energy allocations and commitments

As indicated above, the changes from the Draft IRP capacity allocations see an increase in solar PV and wind, and a significant decrease in gas and diesel; and new inclusions include nuclear and storage.

In terms of renewable energy four bidding rounds have been completed for renewable energy projects under the RE IPP Procurement Programme. The most dominant technology in the IRP2019 is renewable energy from wind and solar PV technologies, with wind being identified as the stronger of the two technologies. There is a consistent

annual allocation of 1 600MW for wind technology commencing in the year 2022 up to 2030. The solar PV allocation of 1 000MWs per year is incremental over the period up to 2030, with no allocation in the years 2024 (being the year the Koeberg nuclear extension is expected to be commissioned) and the years 2026 and 2027 (presumably since 2 000MW of gas is expected in the year 2027). The IRP 2019 states that although there are annual build limits, in the long run such limits will be reviewed to take into account demand and supply requirements.

2.2.6 National Development Plan

The National Development Plan (NDP) contains a plan aimed at eliminating poverty and reducing inequality by 2030. The NDP identifies 9 key challenges and associated remedial plans. Managing the transition towards a low carbon national economy is identified as one of the 9 key national challenges. Expansion and acceleration of commercial renewable energy is identified as a key intervention strategy.

2.2.7 The New Growth Path Framework

The aim of the New Economic Growth Path Framework is to enhance growth, employment creation and equity. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard, the framework identifies investments in five key areas namely: energy, transport, communication, water and housing.

The New Growth Path also identifies five other priority areas as part of the programme, through a series of partnerships between the State and the private sector. The Green Economy as one of the five priority areas to create jobs, including expansions in construction and the production of technologies for solar, wind and biofuels. In this regard, clean manufacturing and environmental services are projected to create 300 000 jobs over the next decade.

2.2.8 National Infrastructure Plan

The South African Government adopted a National Infrastructure Plan in 2012. The aim of the plan is to transform the economic landscape while simultaneously creating significant numbers of new jobs and strengthening the delivery of basic services. The plan also supports the integration of African economies. In terms of the plan, Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure. The aim of the investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, **electricity plants**, hospitals, schools and dams will contribute to improved economic growth.

As part of the National Infrastructure Plan, Cabinet established the Presidential Infrastructure Coordinating Committee (PICC). The Committee identified and developed 18 strategic integrated projects (SIPs). The SIPs cover social and economic infrastructure across all nine provinces (with an emphasis on lagging regions) and consist of:

- Five geographically-focussed SIPs.
- Three spatial SIPs.
- Three energy SIPs.
- Three social infrastructure SIPs.
- Two knowledge SIPs.

- One regional integration SIP.
- One water and sanitation SIP.

The three energy SIPS are SIP 8, 9 and 10.

SIP 8: Green energy in support of the South African economy

- Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010).
- Support bio-fuel production facilities.

SIP 9: Electricity generation to support socio-economic development

- Accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances.
- Monitor implementation of major projects such as new power stations: Medupi, Kusile and Ingula.

SIP 10: Electricity transmission and distribution for all

- Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development.
- Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

2.2.9 Astronomy Geographic Advantage Act

The purpose of the Act (Act No 21 of 2007) is to preserve the geographic advantage areas that attract investment in astronomy. The entire Northern Cape Province, excluding the Tsantsabane Municipality, has been declared an astronomy advantage area. The Northern Cape optical and radio telescope sites were declared core astronomy advantage areas. The Act allowed for the declaration of the Southern Africa Large Telescope (SALT), Meerkat and Square Kilometre Array (SKA) as astronomy and related scientific endeavours that has to be protected.

2.3 PROVINCIAL AND LOCAL LEVEL POLICY AND PLANNING

2.3.1 Northern Cape Province Provincial Growth and Development Strategy

The Northern Cape Provincial Growth and Development Strategy (NCPGDS) identifies poverty reduction as the most significant challenge facing the government and its partners. All other societal challenges that the province faces emanate predominantly from the effects of poverty. The NCPGDS notes that the only effective way to reduce poverty is through long-term sustainable economic growth and development. The sectors where economic growth and development can be promoted include:

- Agriculture and Agro-processing.
- Fishing and Mariculture.
- Mining and mineral processing.
- Transport.
- Manufacturing.
- Tourism.

However, the NCPGDS also notes that economic development in these sectors also requires:

- Creating opportunities for lifelong learning.
- Improving the skills of the labour force to increase productivity.
- Increasing accessibility to knowledge and information.

The achievement of these primary development objectives depends on the achievement of a number of related objectives that, at a macro-level, describe necessary conditions for growth and development. These are:

- Developing requisite levels of human and social capital.
- Improving the efficiency and effectiveness of governance and other development institutions.
- Enhancing infrastructure for economic growth and social development.

Of specific relevance to the SIA the NCPGDS makes reference to the need to ensure the availability of inexpensive energy. The section notes that in order to promote economic growth in the Northern Cape the availability of electricity to key industrial users at critical localities at rates that enhance the competitiveness of their industries must be ensured. At the same time, the development of new sources of energy through the promotion of the adoption of energy applications that display a synergy with the province's natural resource endowments must be encouraged. In this regard the NCPGDS notes "the development of energy sources such as solar energy, the natural gas fields, bio-fuels, etc., could be some of the means by which new economic opportunity and activity is generated in the Northern Cape". The NCPGDS also highlights the importance of close co-operation between the public and private sectors in order for the economic development potential of the Northern Cape to be realised.

The NCPGDS also highlights the importance of enterprise development and notes that the current level of private sector development and investment in the Northern Cape are low. In addition, the province also lags in the key policy priority areas of SMME Development and Black Economic Empowerment. The proposed solar energy facility therefore has the potential to create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province.

In this regard, care will need to be taken to ensure that the proposed development and associated renewable energy facilities do not negatively impact on the regions natural environment. In this regard, the NCPGDS notes that the sustainable utilisation of the natural resource base on which agriculture depends is critical in the Northern Cape with its fragile eco-systems and vulnerability to climatic variation. The document also indicates that due to the provinces exceptional natural and cultural attributes, it has the potential to become the preferred adventure and ecotourism destination in South Africa.

2.3.2 Northern Cape Provincial Spatial Development Framework

Northern Cape Provincial Spatial Development Framework (NCSDf) (2012) lists a number of sectoral strategies and plans that are to be read and treated as key components of the PSDf. Of these there are a number that are relevant to the proposed STPs. These include:

- Sectoral Strategy 1: Provincial Growth and Development Strategy of the Provincial Government.
- Sectoral Strategy 2: Comprehensive Growth and Development Programme of the Department of Agriculture, Land Reform and Rural Development.

- Sectoral Strategy 5: Local Economic Development (LED) Strategy of the Department of Economic Development and Tourism.
- Sectoral Strategy 11: Small Micro Medium Enterprises (SMME) Development Strategy of the Department of Economic Development and Tourism.
- Sectoral Strategy 12: Tourism Strategy of the Department of Economic Development and Tourism.
- Sectoral Strategy 19: Provincial renewable energy strategy (to be facilitated by the Department of Economic Development and Tourism).

Section C8.2.3, Energy Objectives, sets out the energy objectives for the Northern Cape Province. The section makes specific reference to renewable energy. Of relevance the objectives include:

- Promote the development of renewable energy supply schemes. Large-scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports while minimizing detrimental environmental impacts.
- In order to reinforce the existing transmission network and to ensure a reliable electricity supply in the Northern Cape, construct a 400 kV transmission power line from Ferrum Substation (near Kathu/Sishen) to Garona Substation (near Groblershoop). There is a national electricity supply shortage, and the country is now in a position where it needs to commission additional plants urgently. Consequently, renewable energy projects are a high priority.
- Develop and institute innovative new energy technologies to improve access to reliable, sustainable, and affordable energy services with the objective to realize sustainable economic growth and development. The goals of securing supply, providing energy services, tackling climate change, avoiding air pollution, and reaching sustainable development in the province offer both opportunities and synergies which require joint planning between local and provincial government as well as the private sector.
- Develop and institute energy supply schemes with the aim to contribute to the achievement of the targets set by the White Paper on Renewable Energy (2003). This target relates to the delivery of 10 000 GWh of energy from renewable energy sources (mainly biomass, wind, solar, and small-scale hydro) by 2013.

Section C8.3.3, Energy Policy, sets out the policy guidelines for the development of the energy sector, with specific reference to the renewable energy sector.

- The construction of telecommunication infrastructure must be strictly regulated in terms of the spatial plans and guidelines put forward in the PSDF. They must be carefully placed to avoid visual impacts on landscapes of significant symbolic, aesthetic, cultural or historic value and should blend in with the surrounding environment to the extent possible.
- EIAs undertaken for such construction must assess the impacts of such activities against the directives listed in (a) above.
- Renewable energy sources such as wind, solar, thermal, biomass and domestic hydroelectricity are to constitute 25% of the province's energy generation capacity by 2020.
 - The following key policy principles for renewable energy apply.
 - Full cost accounting: Pricing policies will be based on an assessment of the full economic, social and environmental costs and benefits of energy production and utilisation.
 - Equity: There should be equitable access to basic services to meet human needs and ensure human well-being. Each generation has a duty to avoid impairing the ability of future generations to ensure their own well-being.

- Global and international cooperation and responsibilities: Government recognises its shared responsibility for global and regional issues and act with due regard to the principles contained in relevant policies and applicable regional and international agreements.
- Allocation of functions: Government will allocate functions within the framework of the Constitution to competent institutions and spheres of government that can most effectively achieve the objectives of the energy policy.
- The implementation of sustainable renewable energy is to be promoted through appropriate financial and fiscal instruments.
- An effective legislative system to promote the implementation of renewable energy is to be developed, implemented, and continuously improved.
- Public awareness of the benefits and opportunities of renewable energy must be promoted.
- The development of renewable energy systems is to be harnessed as a mechanism for economic development throughout the province in accordance with the Sustainable Development Initiative (SDI) approach (refer to Toolkit D10) or any comparable approach.
- Renewable energy must, first, and foremost, be used to address the needs of the province before being exported.

2.2.3 Northern Cape Climate Change Response Strategy

The key aspects of the PCCRS Report are summarised in the MEC's (NCPG: Environment and Nature Conservation) 2011 budget speech: "The Provincial Climate Change Response Strategy will be underpinned by specific critical sector climate change adaptation and mitigation strategies that include the Water, Agriculture and Human Health sectors as the 3 key Adaptation Sectors, the Industry and Transport alongside the Energy sector as the 3 key Mitigation Sectors with the Disaster Management, Natural Resources and Human Society, livelihoods and Services sectors as 3 remaining key Sectors to ensure proactive long term responses to the frequency and intensity of extreme weather events such as flooding and wild fire, with heightened requirements for effective disaster management".

Key points from MEC's address include the NCPG's commitment to develop and implement policy in accord with the National Green Paper for the National Climate Change Response Strategy (2010), and an acknowledgement of the NCP's extreme vulnerability to climate-change driven desertification. The development and promotion of a provincial green economy, including green jobs, is identified as an important provincial intervention in addressing climate change. The renewable energy sector, including solar and wind energy (but also biofuels and energy from waste), is explicitly indicated as an important element of the Provincial Climate Change Response Strategy. The MEC also indicated that the NCP was involved in the processing a number of WEF and Solar Energy Facility EIA applications.

2.2.4 Northern Cape Province Green Document

The NCP Green Document (2017-2018) was prepared by the Northern Cape Department of Economic Development and Tourism and provides an impact assessment of IPPs on the communities in the province located within a 50 km radius from existing facilities. The document notes that the NCP is nationally a leader in commercial-scale renewable energy projects. By 2018 a total of 23 IPP projects in the province had been integrated into the national grid. These projects include Solar PV, Concentrated Solar and WEFs. The document notes that through their economic development obligations these projects have already made a significant positive contribution to affected communities. Much of the effort has been directed at

supporting local education. The document also notes that, as these projects are committed to 20-year minimum lifespans, the collectively hold a tremendous potential for socio-economic upliftment.

Key issues identified with regard to improving the potential beneficial impact of IPPs in the NCP include:

- Local community members abusing project benefits for personal gain.
- Difficulty in outreach to local community beneficiaries due to high local illiteracy levels.
- A lack of business skills generally hampers the successful establishment of local small enterprises which could benefit from projects.
- Community benefit obligations are currently met in a piecemeal and uncoordinated fashion.
- Anticipated community benefits are often frustrated by inadequate engagement and insufficient ongoing consultation.
- The scarcity of people skilled in maths and sciences in local communities hampers meaningful higher-level local skills development and employment.
- Insufficient support from local municipalities for IPP development.

2.3.4 Pixley ka Seme District Municipality Integrated Development Plan

The vision for the PKSDM is “Developed and Sustainable District for Future Generations”

To mission statement that underpins the vision is:

- Supporting our local municipalities to create a home for all in our towns, settlements, and rural areas to render dedicated services.
- Providing political and administrative leadership and direction in the development planning process.
- Promoting economic growth that is shared across and within communities.
- Promoting and enhancing integrated development planning in the operations of our municipalities.
- Aligning development initiatives in the district to the National Development Plan.

The Strategic Objectives to address the vision that are relevant to the project includes the promotion of economic growth in the district and enhance service delivery. Chapter 4, Development of Strategies, highlights the key strategies of the PKSDM. The promotion of economic development is the most relevant strategy for the project. The IDP also notes that the growth and development context in the district has also changed radically since 2013 (after it had been stagnant for decades) owing mainly to private and public investments in the area as a hub for renewable energy generation and astronomy.

The IDP notes that the economy in the Pixley ka Seme municipal area is characterized by:

- High levels of poverty and low levels of education.
- Low levels of development despite the strategic location in terms of the national transport corridors.
- High rate of unemployment, poverty and social grant dependence.
- Prone to significant environmental changes owing to long-term structural changes (such as climate change, energy crises and other shifts).

Of specific relevance the IDP highlights the potential for renewable energy to help address some of these challenges.

2.3.5 Pixley ka Seme District Municipality Spatial Development Framework

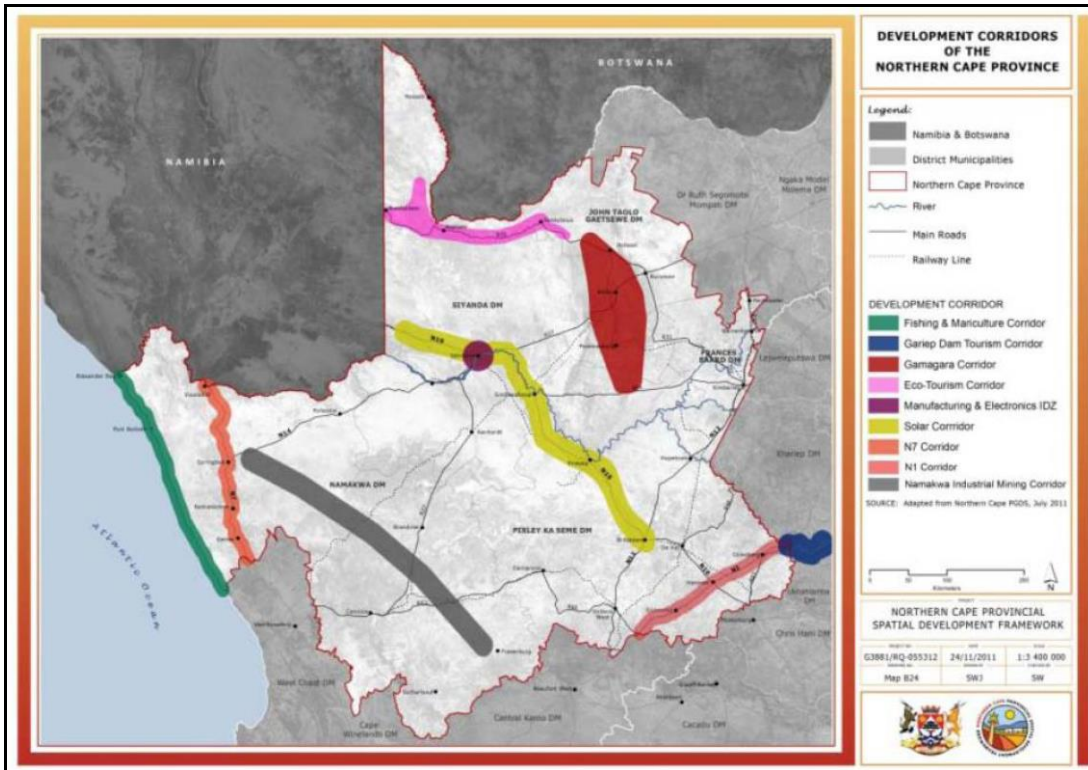
The SDF notes that the vision for the PKSDM is "Pixley Ka Seme DM, pioneers of development, a home and future for all". The Mission Statement that underpins the vision refers to:

- Effective and efficient service delivery.
- Optimal human and natural resource development.
- Local economic growth and development, job creation and poverty alleviation.
- A vibrant tourism industry.
- To participate in the fight to reduce the infection rate and lessen the impact of HIV/ Aids and other communicable diseases.
- A safe, secure and community friendly environment.

The SDF identifies the opportunities and constraints associated with the district. Of relevance to the project the opportunities include:

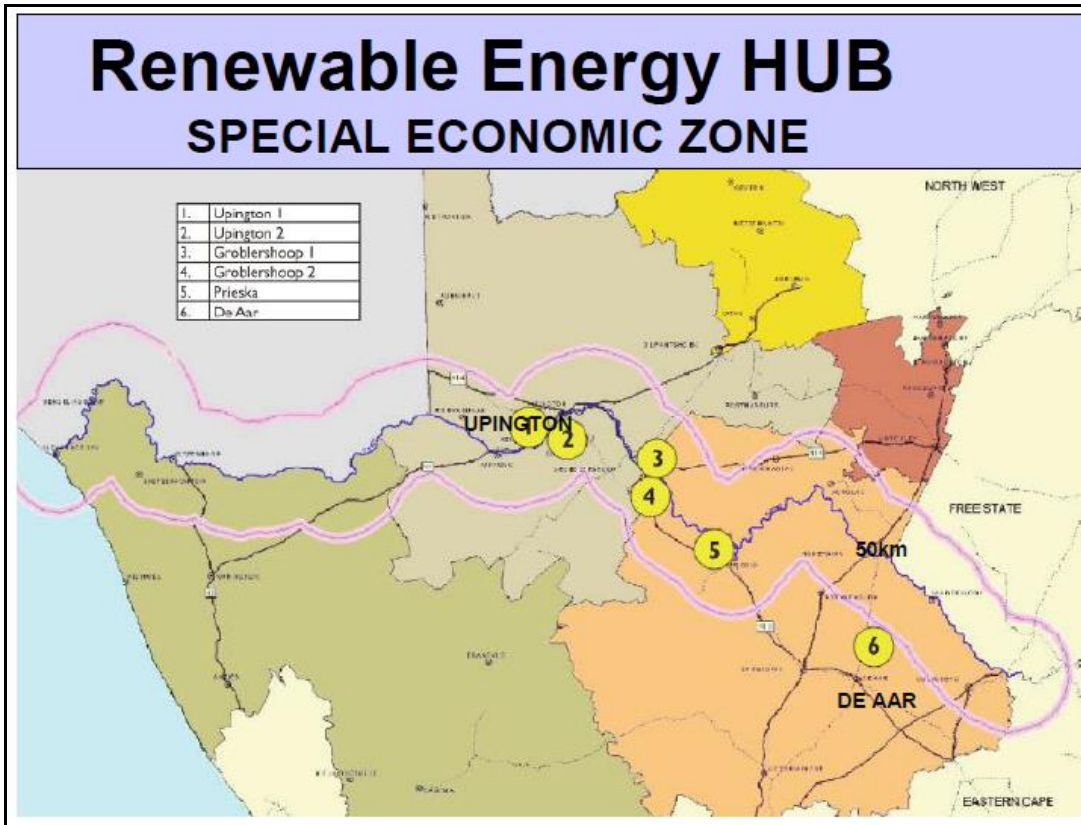
Renewable Energy and the identification of a renewable energy hub in the region. The natural environment and maintenance and conservation of the pristine natural environment to support sustainable farming into the future is also identified as an opportunity. The SDF notes that Pixley Ka Seme District area with its abundance of sunshine and vast tracts of available land has attracted considerable interest from solar energy investors. The high solar index of the area provides many opportunities in terms of the development of renewable energy. This has been acknowledged by the Northern Cape Government with the identification of the Renewable Energy Hub. The areas around the northern and eastern borders of the Pixley Ka Seme District Municipality form part of this hub with the potential to stimulate special economic development zoned within the area that have the potential to stimulate industrial development.

The PKSDM also falls within the Solar Development Corridor as identified in the Northern Cape Provincial Spatial Development Framework. The corridor extends from Kakamas to Upington and down to De Aar in the south-east (Figure 2.2). Section 5.6.1 of the SDF also refers to the establishment of a Renewable Energy Hub proposed for the Northern Cape stretching from the west coast right up to the De Aar region (Figure 2.3). The Hub can accommodate special economic development within the zone as earmarked and entails a 100km wide zone. The proposed project is located outside corridor and proposed hub. However, this does not imply that the area is not suitable for the establishment of solar energy facilities.



Source: Northern Cape SDF

Figure 2.2: Northern Cape Development Corridors-Solar Corridor (yellow)



Source: Northern PKSDM SDF

Figure 2.3: Northern Cape Renewable Energy Hub

The SDF does however also note that the area is known for its clean air and open skies with limited light pollution. Potential visual impacts are therefore an issue that needs to be considered.

In this regard the SDF notes that the topography of Pixley Ka Seme region is one of its main assets with vast open spaces and unspoilt panoramic visual vistas stretching over great distances. This asset makes for excellent scenic drives throughout the whole of the region from the flat plains to crossing the main rivers of South Africa. Visual vistas, ridges and "koppies" are assets within the region and they must be handled with sensitivity.

The relevant constraints include high levels of poverty and unemployment, backlog in basic services, including electricity and housing in rural areas, the limited supply of water and overall scarcity of water in the region to support economic development.

The development challenges that face the Pixley Ka Seme District Municipality include high unemployment and poverty rates and low income which are placing increasing demand on service delivery because very few people are able to pay for services. Declining population numbers, and alcohol and substance abuse are also key challenges.

In terms of services, inadequate schools in farming areas results in children having to travel long distances to areas where they go to school. There are also insufficient health centres and lack of amenities and recreational services. Where these services do exist, they are often poorly managed and maintained. The level of key services, such as refuse removal, are also low, while many rural and a number of urban households rely on boreholes for their water supply.

Climate change is also identified as a key risk. The SDF notes that the Karoo is predicted to experience more drought periods, coupled with increased evaporation and temperatures and this will negatively impact already restricted water supply. It is likely that the greatest impacts will be on water supply.

2.3.6 Ubuntu Local Municipality Integrated Development Plan

The vision of ULM is "By 2030, Ubuntu Municipality shall be the best rural municipality through relentless pursuit of excellence through focused governance, efficient administration, and effective service delivery for inclusive targeted social and economic development against all odds".

The mission is to:

- Maximize the utility of the municipal resources in a sustainable, developmental, and economic manner to better the life of all.
- Improve institutional effectiveness and efficiency.
- Optimally develop our human, financial and natural resources.
- Create an enabling environment for local economic growth in order to create employment opportunities and alleviate poverty.
- Work with all our existing and prospective partners to establish a vibrant tourism industry.
- Participate in the fight to reduce the HIV/AIDS infection rate and lessen the impact thereof.
- Focus on youth development, women empowerment and enabling the disabled to play a meaningful role in unlocking human potential.

- Ensure a safe, secure and community friendly environment.
- Maintain sound and sustainable management of financial and fiscal affairs.

Based on the 2011 Census data the largest town in the ULM was Victoria West with a population of 7 611, followed by Richmond (2 841) and Loxton (921). Key issues facing the municipality include:

- High level of illiteracy.
- Poverty and unemployment.
- Limited educational facilities

The IDP identifies a number of challenges facing the area in terms of economic development and growth. Of relevance to the project these include:

- Unemployment and poverty.
- Shortage of critical skills
- Needs of vulnerable groups, including women, disabled and youth.
- Access to basic services such as water, sanitation, electricity and housing.
- Improved access to services in education, health and social services.
- Reduction in the rate of crime.

The key sectors in the local economy agriculture is the key economic sector. Livestock and game form the nucleus of farming activities, with limited crop farming. Livestock farming mainly comprises of sheep, goat and cattle. The main agricultural products are wool for the export market and meat for the local market. Biltong and hunting are the major products of game farming. Game biltong is produced at and exported from a factory in Victoria West.

Chapter 3 of the IDP outlines the development strategies for the ULM. The IDP strategies are aligned with the National Key Performance Areas (KPA's). The KPA's that are relevant to the project include:

- KPA 1: Basic Service Delivery and Infrastructure Development

The strategic objectives under KPA 1 include the provision of sustainable basic services.

- KPA 2: Local Economic Development

The strategic objectives under KPA 1 include investment acceleration and attraction, including a focus on private sector investment, promotion of SMMEs, agriculture, tourism and the development of an industrial and commercial economic zone.

In terms of Ward 3, the following challenges and needs were identified as part of the IDP process.

- High unemployment and poverty rates.
- Need for a youth centre.
- Need to upgrade firefighting services.
- Illegal dumping.

These issues can be addressed by SED and ED spend linked to the project.

2.4 OVERVIEW RENEWABLE ENERGY SECTOR IN SOUTH AFRICA

The section below provides an overview of the potential benefits associated with the renewable energy sector in South Africa. Given that South Africa supports the development of renewable energy at national level, the intention is not to provide a critical review of renewable energy. The focus is therefore on the contribution of renewable energy, specifically in terms of supporting economic development.

The following documents were reviewed:

- Independent Power Producers Procurement Programme (IPPPP): An Overview (June 2020), Department of Energy, National Treasury and DBSA.
- Green Jobs Study (2011), IDC, DBSA Ltd and TIPS.
- Powering the Future: Renewable Energy Roll-out in South Africa (2013), Greenpeace South Africa.
- WWF SA, Renewable Energy Vision 2030, South Africa, 2014.
- Jacqueline M. Borel-Saladin, Ivan N. Turok, (2013). The impact of the green economy on jobs in South Africa, South African Journal of Science, *Volume 109 /Number 9/10, September/October 2013*.
- The potential for local community benefits from wind farms in South Africa, Louise Tait (2012), Master's Thesis, Energy Research Centre University of Cape Town.

2.4.1 Independent Power Producers Procurement Programme (IPPPP): An Overview

The document presents an overview of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) undertaken by the Department of Energy, National Treasury and the Development Bank of South Africa in June 2020. The programme's primary mandate is to secure electrical energy from the private sector for renewable and non-renewable energy sources. With regard to renewables, the programme is designed to reduce the country's reliance on fossil fuels, stimulate an indigenous renewable energy industry and contribute to socio-economic development and environmentally sustainable growth. The IPPPP has been designed not only to procure energy but has also been structured to contribute to the broader national development objectives of job creation, social upliftment and broadening of economic ownership.

Energy supply

By the end of June 2020, the REIPPPP had made the following significant impacts.

- 6 422MW of electricity had been procured from 112 RE Independent Power Producers (IPPs) in seven bid rounds.
- 4 276 MW of electricity generation capacity from 68 IPP projects has been connected to the national grid.
- 49 461GWh of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational in November 2013.

Renewable energy IPPs have proved to be very reliable. Of the 68 projects that have reached COD, 64 projects have been operational for longer than a year. The energy generated over the past 12-month period for these 64 projects is 11 079GWh, which is 93% of their annual energy contribution projections (P50) of 11 882GWh over a 12-month delivery period. Twenty-eight (24) of the 64 projects (38%) have individually exceeded their P50 projections.

Energy costs

In line with international experience, the price of renewable energy is increasingly cost competitive when compared with conventional power sources. The REIPPPP has effectively captured this global downward trend with prices decreasing in every bid window. Energy procured by the REIPPPP is progressively more cost effective and has approached a point where the wholesale pricing for new coal-and renewable-generated energy intersect.

Through the competitive bidding process, the IPPPP effectively leveraged rapid, global technology developments and price trends, buying clean energy at lower and lower rates with every bid cycle, resulting in SA getting the benefit of renewable energy at some of the lowest tariffs in the world. The price for wind power has dropped by 50% to R0.91/kWh, with the BW4 price directly comparable with the per kWh price of new coal generation. Solar PV has dropped most significantly with a price decrease of 75% to R1.10/kWh between BW1 and BW4.

This compares with the industry estimates in April 2020 of R1.45/kWh for Medupi. Considering the on-going delays incompletion, indications are that these costs may even be significantly higher.

Investment

The document notes that the REIPPPP has attracted significant investment in the development of the REIPPs into the country. The total investment (total project costs³), including interest during construction, of projects under construction and projects in the process of closure is R209.7 billion (this includes total debt and equity of R209.2 billion, as well as early revenue and VAT facility of R0.5 billion).

The REIPPPP has attracted R41.8 billion in foreign investment and financing in the seven bid windows (BW1 – BW4, 1S2 and 2S2). This is almost double the inward FDI attracted into South Africa during 2015 (R22.6 billion). The document notes that the share of foreign investment and equity showed an increase in the most recent bid window (2S2), suggesting that the REIPPPP continued to generate investor confidence despite the poor economic conditions in South Africa in recent years.

South African citizen shareholding

The importance of retaining local shareholding in IPPs is key condition of the procurement requirements. The RFP notes that bidders are required to have South African Equity Participation of 40% in order to be evaluated. In terms of local equity shareholding, 52% (R31.5 billion) of the total equity shareholding (R61.0 billion) was held by South African's across BW1 to BW4, 1S2 and 2S2. This equates to substantially more than the 40% requirement. Foreign equity amounts to R29.5 billion and contributes 48% of total equity.

The REIPPPP also contributes to Broad Based Black Economic Empowerment and the creation of black industrialists. In this regard, Black South Africans own, on average, 33% of projects that have reached financial close (BW1-BW4), which is 3% higher than the 30% target. This includes black people in local communities that have ownership in the IPP projects that operate in or near their communities and represents the majority share of total South African Entity Participation.

³ Total project costs means the total capital expenditure to be incurred up to the commercial operations date in the design, construction, development, installation, and or commissioning of the project)

On average, black local communities own 9% of projects that have reached financial close. This is well above the 5% target. In addition, an average of 21% shareholding by black people in engineering, procurement, and construction (EPC) contractors has been attained for projects that have reached financial closure. This is higher than 20% target. The shareholding by black people in operating companies of IPPs has averaged 24% (against the targeted 20%) for the 68 projects in operation (i.e. in BW1–4).

The target for shareholding by black people in top management has been set at 40%, with an average 67% achieved to date. The target has therefore been significantly exceeded.

Community shareholding and community trusts

The regulations require a minimum ownership of 2.5% by local communities in IPP projects as a procurement condition. This is to ensure that a substantial portion of the investments has been structured and secured as local community equity. An individual community's dividends earned will depend on the terms of each transaction corresponding with the relevant equity share. To date all shareholding for local communities have been structured through the establishment of community trusts. For projects in BW1 to BW4, 1S2 and 2S2, qualifying communities will receive R26.9 billion net income over the life of the projects (20 years). The report notes that the bulk of the money will however only start flowing into the communities from 2028 due to repayment obligations in the preceding years (repayment obligations are mostly to development funding institutions). However, despite the delay this represents a significant injection of capital into mainly rural areas of South Africa. If the net projected income for the first seven bid windows (BW1-BW4, 1S2 and 2S2) was structured as equal payments overtime, it would represent an annual net income of R1.34 billion per year.

Income to all shareholders only commences with operation of the facility. Revenue generated to date by the 68 operational IPPs amounts to R105 billion.

Procurement spend

In addition to the financial investments into the economy and favourable equity structures aimed at supporting BEE, the REIPPPP also targets broader economic and socio-economic investment. This is through procurement spend and local content.

The total projected procurement spend for BW1 to BW4, 1S2 and 2S2 during the construction phase was R73.1 billion, while the projected operations procurement spend over the 20 years operational life is estimated at 76.8 billion. The combined (construction and operations) procurement value is projected as R149.9 billion of which R81 billion has been spent to date. For construction, of the R70.2 billion already spent to date, R57.7 billion is from the 68 projects which have already been completed. These 68 projects had planned to spend R52.9 billion. The actual procurement construction costs have therefore exceeded the planned costs by 9% for completed projects.

Preferential procurement

The share of procurement that is sourced from Broad Based Black Economic Empowered (BBBEE) suppliers, Qualifying Small Enterprises (QSE), Exempted Micro Enterprises (EME) and women owned vendors are tracked against commitments and targeted percentages. The IA target requirement for BBBEE is 60% of total procurement spend. However, the actual share of procurement spend by IPPs from BBBEE suppliers for construction and operations combined is currently reported as 83%, which is significantly higher than the target of 60%, but also the 71% that had been committed by IPPs. BBBEE, as a share of procurement spend for projects in

construction, is also reported as 84% with operations slightly lower at 74%. However, these figures have not been verified and the report notes that they are reported with caution.

The majority of the procurement spend to date has been for construction purposes. Of the R70.2 billion spent on procurement during construction, R59 billion has reportedly been procured from BBBEE suppliers, achieving 87% of total procured. Actual BBBEE spend during construction for BW1 and BW2 alone was R25.5 billion, 81% more than the 14.1 billion planned by the IPPs. The R59 billion spent on BBBEE during construction is 15% more than the R51.1 billion that had originally been anticipated by all IPPs procured.

Total procurement spend by IPPs from QSE and EMEs has amounted to R24.7 billion (construction and operations) to date, which exceeds commitments by 96% and is 30% of total procurement spend to date (while the required target is 10%). QSE and EME's procurement spend for construction was R 22 billion, which is 4.4 times the targeted spend for construction of R4.9 billion during this procurement phase.

In terms of procurement from women-owned vendors to date, 5% of total construction procurement spend has been from woman-owned vendors (against a targeted 5%), and 6% of operational procurement spend has been realised from woman-owned vendors to date, thereby exceeding the targeted 5%. In terms of construction spend, R 3.2 billion was undertaken by women-owned vendors, which is almost double the R 1.9 billion estimated for the construction of projects that have reached financial close.

The REIPPPP has therefore created significant employment opportunities for black South African citizens and local communities beyond planned targets. This highlights the importance of the programme in terms of employment equity and the creation of more equal societies.

Local Content⁴

The report notes that the REIPPPP programme represents the country's most comprehensive strategy to date in achieving the transition to a greener economy. Local content minimum thresholds and targets were set higher for each subsequent bid window. The report notes that for a programme of this magnitude, with construction procurement spend alone estimated at R73.1 billion, the result is a substantial stimulus for establishing local manufacturing capacity. The local content strategy has created the required incentives for a number of international technology and component manufactures to establish local manufacturing facilities.

The documents notes that for the portfolio as a whole, the expectation would reasonably be for local content spend to fall between 25% and 65% of the total project value (considering the range of targets and minimum requirements). Local content commitments by IPPs amount to R67.6 billion or 45% of total project value (R151.1billion for all bid windows).

Actual local content spend reported for IPPs that have started construction amounts to R57.6 billion against a corresponding project value (as realised to date) of R114 billion. This means that 50% of the project value has been locally procured, exceeding the 45% commitment from IPPs and the thresholds for BW1 – BW4 (25-45%).

⁴ Local content is expressed as a % of the total project value and not procurement or total project costs.

To date, the R57.6 billion local content spend reported by active IPPs is already 87% of the R66 billion local content expected. This is with 23 projects still in construction, and 68 of the 91 active projects having reached COD (i.e. 75% of the active portfolio complete). For the 68 projects that have reached COD, local content spend has been R46.96 billion of a committed R46.55 billion, which is 0.9 more than the planned local spend.

Leveraging employment opportunities

To date, a total of 52 603 job years⁵ have been created for South African citizens, of which 42 355 job years were in construction and 10 248 in operations. These job years should rise further past the planned target as more projects enter the construction phase. Employment opportunities across all five active bid windows are 126% of the planned number during the construction phase (i.e. 33 707 job years), with 23 projects still in construction and employing people. The number of employment opportunities is therefore likely to continue to grow beyond the original expectations. By the end of June 2020, 68 projects had successfully completed construction and moved into operation. These projects created 33 449 job years of employment, compared to the anticipated 23 619. This was 42% more than planned.

The report notes that employment thresholds and targets were consistently exceeded across the entire portfolio. The average share of South African citizens of total South Africa based employees for BW1 – BW4 was 91% during construction (against a target of 80%), while it was 91% during operations for BW1 – BW4 (against a target of 80%). The report notes that the construction phase offers a high number of opportunities over shorter durations, while the operations phase requires fewer people, but over an extended operating period.

To date, 42 355 job years for SA citizens were achieved during construction, which is 26% above the planned 33 707 job years for active projects. These job years are expected to rise further since 23 BW4 projects are still in or entering, construction.

In terms of benefits for local communities, significantly more people from local communities were employed during construction than was initially planned. For active projects, the expectation for local community participation was 13 284 job years. To date 22 935 job years have been realised (i.e. 73% more than initially planned), with 23 projects still in, or entering, construction. The number of black SA citizens employed during construction also exceeded the planned numbers by 53%.

Black South African citizens, youths and rural or local communities have been the major beneficiaries during the construction phases, as they respectively represent 81%, 43% and 49% of total job opportunities created by IPPs to date. However, woman and disabled people could still be significantly empowered as they represent a mere 10% and 0.4% of total jobs created to date, respectively. Nonetheless, the fact that the REIPPPP has raised employment opportunities for black South African citizens and local communities beyond planned targets, indicates the importance of the programme to employment equity and the drive towards more equal societies.

The share of black citizens employed during construction (81%) and the early stages of operations (84%) has significantly exceeded the 50% target and the 30% minimum threshold. Likewise, the share of skilled black citizens (as a percentage of skilled

⁵ The equivalent of a full-time employment opportunity for one person for one year

employees) for both construction (69%) and operations (80%) has also exceeded the 30% target and minimum threshold of 18%. The share of local community members as a share of SA-based employees was 49% and 68% for construction and operations respectively – exceeding the minimum threshold of 12% and the target of 20%.

Socio-economic development (SED) contributions

An important focus of the REIPPPP is to ensure that the build programme secures sustainable value for the country and enables local communities to benefit directly from the investments attracted into the area. In this regard, IPPs are required to contribute a percentage of projected revenues accrued over the 20-year project operational life toward SED initiatives. These contributions accrue over the 20-year project operation life and are used to invest in housing and infrastructure as well as healthcare, education, and skills development.

The minimum compliance threshold for SED contributions is 1% of the revenue with 1.5% the targeted level over the 20-year project operational life. For the current portfolio of projects, the average commitment level is 2.2%, which is 125% higher than the minimum threshold level. To date (across seven bid windows) a total contribution of R23.1 billion has been committed to SED initiatives. Assuming an even, annual revenue spread, the average contribution per year would be R1.2 billion. Of the total commitment, R18.8 billion is specifically allocated for local communities where the IPPs operate. With every new IPP on the grid, revenues and the respective SED contributions will increase.

As a percentage of revenue, SED obligations become effective only when operations commence, and revenue is generated. Of the 91 IPPs that have reached financial close (BW1–BW41), 68 are operational. The SED contributions associated with these 68 projects has amounted to R 1.2 billion to date.

In terms of ED and SED spend, education, social welfare, and health care initiatives have a SED focus. SED spend on education has been almost double the expenditure on enterprise development. This is despite enterprise development being a stand-alone commitment category in terms of the IA. This is, in part, due to the fact that some early childhood development programmes have also been incorporated in educational programmes. IPPs have supported 1 123 education institutions with a total of R312 million in contributions, from 2015 to the end of June 2020. A total of 1 142 bursaries, amounting to R183.8 million, have been awarded by 55 IPPs from 2015 until the end of June 2020. The largest portion of the bursaries were awarded to African and Coloured students (97%), with women and girls receiving 56% of total bursaries. The Northern Cape province benefitted most from the bursaries awarded, with 61%, followed by the Eastern Cape (18%) and Western Cape (14%). Enterprise development and social welfare are the focus areas that have received the second highest share of the contributions to date.

Enterprise development contributions

The target for IPPs to spend on enterprise development is 0.6% of revenues over the 20- year project operational life. However, for the current portfolio, IPPs have committed an average of 0.63% or 0.03% more than the target. Enterprise development contributions committed for BW1 to BW4, 1S2 and 2S2 amount to R7.2 billion. Assuming an equal distribution of revenue over the 20-year project operational life, enterprise development contributions would be R360 million per annum. Of the total commitment, R5.6 billion is specifically committed directly within the local communities where the IPPs operate, contributing significantly to local enterprise development. Up until the end of June 2020 a total of R 384.2 million had already been made to the local communities located in the vicinity of the 68 operating IPPs. This

represents 93% of the total R384.2 million enterprise development contributions made to date.

Contribution to cleaner energy and water savings

As part of the global commitment, South Africa is targeting an emissions trajectory that peaks at 34% below a “business as usual” case in 2020, 42% below in 2025 and from 2035 declines in absolute terms. These commitments are incorporated into the National Development Plan in Outcome 10 and sub-outcome 3. The REIPPPP contributes constructively to economic stability, energy security and environmental sustainability.

The emission reductions for the programme during the preceding 12 months (June 2019-June 2020) is calculated as 11.5 million tonnes CO₂ (MtonCO₂) based on the 1 1313 GWh energy that has been generated and supplied to the grid over this period. This represents 56% of the total projected annual emission reductions (20.5MtonCO₂) achieved with only partial operations. A total of 50.2 Mton CO₂ equivalent reduction has been realised from programme inception to date.

The March 2019 Report also notes that since operation, the IPPs have saved 42.8 million kilolitres of water related to fossil fuel power generation. This saving will have increased with the increase in energy generated by renewable energy since 2019. The REIPPPP therefore contributes significantly towards meeting South Africa’s GHG emission targets and, at the same time, supporting energy security, economic stability and environmental sustainability.

2.4.2 Green Jobs Study

The study notes that South Africa has one of the most carbon-intensive economies in the world, therefore making the greening of the electricity mix a national imperative. Within this context the study notes that the green economy could be an extremely important trigger and lever for enhancing a country’s growth potential and redirecting its development trajectory in the 21st century. The attractiveness of wind and solar technologies is not only supported by local conditions, but also by the relatively mature stage of their technological development.

The aim of the Green Jobs study was to provide information on the net direct job creation anticipated to emerge in the formal economy across a wide range of technologies/activities that may be classified as green or contributing to the greening of the economy. The study looked at the employment potential for a number of green sectors, including power generation, over three consecutive timeframes, namely, the short term (2011 – 12), medium term (2013 – 17) and long term (2018 – 25). The analysis attempts to estimate the employment potential associated with: building, construction and installation activities; operations and maintenance services; as well as the possible localisation spin-offs for the manufacturing sector as the domestic production of equipment, parts and components benefits from preferential local procurement.

It is also worth noting that the study only considered direct jobs in the formal economy. Multiplier effects were not taken into account. As a result, the analysis only captures a portion of the potential employment impact of a greening economy. International studies have indicated that there are considerable backward and forward linkages through various value chains of production, as well as of indirect and induced employment effects. The employment figures can therefore be regarded as conservative.

The analysis reveals the potential of an unfolding green economy to lead to the creation of approximately 98 000 new direct jobs, on average, in the short term, almost 255 000 in the medium term and around 462 000 employment opportunities in the formal economy in the long term. The number of jobs linked to the power generation was estimated to be ~ 12 500 in the short term, 57 500 in the medium term and 130 000 in the long term. Power generation jobs therefore account for 28% of the employment opportunities created in the long term. However, the report notes that the contribution made by a progressively expanding green energy generation segment increases from 14% of the total in the short term, or just over 13 500 jobs, to more than 28% in the long term (166 400) (Table 2.3). The study also found that energy generation is expected to become an increasingly important contributor to green job creation over time, as projects are constructed or commissioned.

Table 2.3: Net direct employment potential estimated for the four broad types of activity and their respective segments in the long term, and an indication of the roll-out over the three timeframes

Broad green economy category	Segment	Technology/product	Total net direct employment potential in the long-term	Net direct manufacturing employment potential in the long-term	Total net direct employment potential (ST, MT, LT)	Net direct manufacturing employment potential (ST, MT, LT)	
ENERGY GENERATION	Renewable (non-fuel) electricity	Wind power	Onshore wind power	5 156	2 105	VL, L, M	L, M, H
			Offshore wind power				
		Solar power	Concentrated solar power	3 014	608	N, VL, M	N, VL, M
			Photovoltaic power	13 541	8 463	M, H, H	H, VH, VH
		Marine power	Marine power	197	0	N, N, VL	N, N, N
	Hydro power	Large hydro power	272	111	VL, VL, VL	VL, M, VL	
		Micro-/small-hydro power	100	0	VL, VL, VL	N, N, N	
	Fuel-based renewable electricity	Waste-to-energy	Landfills	1 178	180	VL, VL, L	VL, VL, L
			Biomass combustion	37 270	154	VL, H, VH	VL, VL, L
			Anaerobic digestion	1 429	591	VL, VL, L	VL, L, M
			Pyrolysis/Gasification	4 348	2 663	VL, L, M	VL, H, H
			Co-generation	10 789	1 050	L, M, H	M, H, H
	Liquid fuel	Bio-fuels	Bio-ethanol	52 729	6 641	M, H, VH	L, H, VH
			Bio-diesel				
ENERGY GENERATION SUB-TOTAL			130 023	22 566			
ENERGY & RESOURCE EFFICIENCY	Green buildings	Insulation, lighting, windows	7 340	838	L, M, M	L, M, M	
		Solar water heaters	17 621	1 225	L, H, H	L, M, H	
		Rain water harvesting	1 275	181	VL, VL, L	VL, VL, L	
	Transportation	Bus Rapid Transport	41 641	350	VH, VH, VH	H, M, L	
		Industrial	Energy efficient motors	-566	4	VL, VL, VL	VL, VL, VL
		Mechanical insulation	666	89	VL, VL, VL	VL, VL, VL	
	ENERGY & RESOURCE EFFICIENCY SUB-TOTAL			67 977	2 686		
EMMISSIONS AND POLLUTION MITIGATION	Pollution control	Air pollution control	900	166	N, VL, VL	N, L, L	
		Electrical vehicles	11 428	10 642	VL, L, H	N, H, VH	
		Clean stoves	2 783	973	VL, VL, L	VL, L, M	
		Acid mine water treatment	361	0	VL, VL, VL	N, N, N	
	Carbon Capture and Storage		251	0	N, VL, VL	N, N, N	
	Recycling		15 918	9 016	M, H, H	H, VH, VH	
EMMISSIONS AND POLLUTION MITIGATION SUB-TOTAL			31 641	20 797			
NATURAL RESOURCE MANAGEMENT	Biodiversity conservation & eco-system restoration		121 553	0	H, VH, VH	N, N, N	
	Soil & land management		111 373	0	VH, VH, VH	N, N, N	
NATURAL RESOURCE MANAGEMENT SUB-TOTAL			232 926	0			
TOTAL			462 567	46 049			

(Source: Green Jobs Study, 2011)

Notes:

- VH = very high (total employment potential > 20 000 direct jobs; manufacturing employment potential > 3 000 direct jobs);
- H = high (total employment potential > 8 000 but < 20 000; manufacturing employment potential > 1 000 but < 3 000);
- M = medium (total employment potential > 3 000 but < 8 000; manufacturing employment potential > 500 but < 1 000);
- L = low (total employment potential > 1 000 but < 3 000; manufacturing employment potential > 150 but < 500);
- VL = very low (total employment potential > 0 but < 1 000; manufacturing employment potential > 0 but < 150);
- N = negligible/none (total employment potential = 0; manufacturing employment potential = 0).

Of relevance the study also notes that the largest gains are likely to be associated with operations and maintenance (O&M) activities, particularly those involved in the various natural resource management initiatives. In this regard, operations and maintenance employment linked to renewable energy generation plants will also be substantial in the longer term. The employment growth momentum related to building, construction and installation activities peaks in the medium term, largely propelled by mass transportation infrastructure, stabilising thereafter as green building methods become progressively entrenched.

In addition, as projects related to a greening economy are progressively commissioned, the potential for local manufacturing also become increasingly viable. Employment gains in manufacturing are also expected to be relatively more stable than construction activities, since the sector should continue exhibiting growth potential as new and replacement components are produced, as additional markets are penetrated and as new green technologies are introduced. Manufacturing segments with high employment potential in the long term would include suppliers of components for wind and solar farms. The study does note that a shortage of skills in certain professional fields pertinent to renewable energy generation presents a challenge that must be overcome.

The study also identifies a number of advantages associated with renewable energy with a large 'technical' generation potential. In this regard, renewable energy, such as solar and wind, does not emit carbon dioxide (CO₂) in generating electricity and is associated with exceptionally low lifecycle emissions. The construction period for renewable energy projects are much shorter than those of conventional power stations, while an income stream may, in certain instances, be provided to local communities through employment and land rental. The study also notes that the greenhouse gases (GHG) associated with the construction phase are offset within a short period of time compared with the project's lifespan. Renewable power therefore provides an ideal means for reaching emission reduction targets in a relatively easy manner. In addition, and of specific relevance to South Africa, renewable energy source is not dependent on water (as compared to the massive water requirements of conventional power stations), has a limited footprint and therefore does not impact on large tracts of land, poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants.

Of relevance, the study also notes that renewable energy projects in rural areas create an opportunity to benefit the local and regional economy through the creation of jobs and tax revenues.

2.4.3 Powering the Future: Renewable Energy Roll-out in South Africa

The study notes that South Africa has higher CO₂ emissions per GDPppp (2002 figures) from energy and cement production than China or the USA (Letete, T et al). Energy accounts for 83% of the total GHG emissions (excluding land use, land use change and forestry) with fuel combustion in the energy industry accounting for 65% of the energy emissions of South Africa (DEA, 2011).

Within a broader context of climate change, coal energy does not only have environmental impacts, it also has socio-economic impacts. Acid mine drainage from abandoned mines in South Africa impacts on water quality and poses the biggest threat to the country's limited water resources. Huge volumes of water are also required to wash coal and cool operating power stations. Eskom uses an estimated 10 000 litres of water per second due to its dependency on coal (Greenpeace, 2012).

The report notes that the concerns relating to whether South Africa can afford renewable energy arise out of the perception that renewable energy (RE) is expensive while fossil and nuclear technologies are cheap. The premise also ignores life cycle costing of the technologies which is favourable to renewable technologies where the sources of fuel are free or cheap.

2.4.4 WWF SA Renewable Energy Vision 2030

In its vision the WWF motivated for a more ambitious plan, suggesting that the IRP should provide for an 11-19% share of electricity capacity by 2030, depending on the country's growth rate over the next fifteen years. The vision is to increase renewable energy at the expense of new coal-fired and nuclear capacity. The report notes that in addition to the obvious environmental benefits of this scenario, it will enable South Africa to add flexibility to energy supply capacity on an on-demand basis.

The report notes that Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) introduced in 2011, has by all accounts been highly successful in quickly and efficiently delivering clean energy to the grid. Increasingly competitive bidding rounds have led to substantial price reductions. In this regard, the study indicates that in three years, wind and solar PV have reached pricing parity with supply from new coal-fired power stations from a levelised cost of electricity (LCOE) perspective.

In bidding window 3 of August 2013, the average tariffs bid for wind and solar PV were R0,66/kWh and R0.88/kWh respectively, well below the recent estimates of R1.05/kWh for supply from the coal-fired Medupi and Kusile power stations (Papapetrou 2014).

The report also notes that the REIPPPP has several contracting rounds for new renewables supply. A robust procurement process, extension of a 20-year sovereign guarantee on the power purchase agreement (PPA) and, especially, ideal solar power conditions, have driven the investment case for RE in South Africa. In this regard, South Africa has been identified as one of the worlds' leading clean energy investment destinations (Figure 2.1).

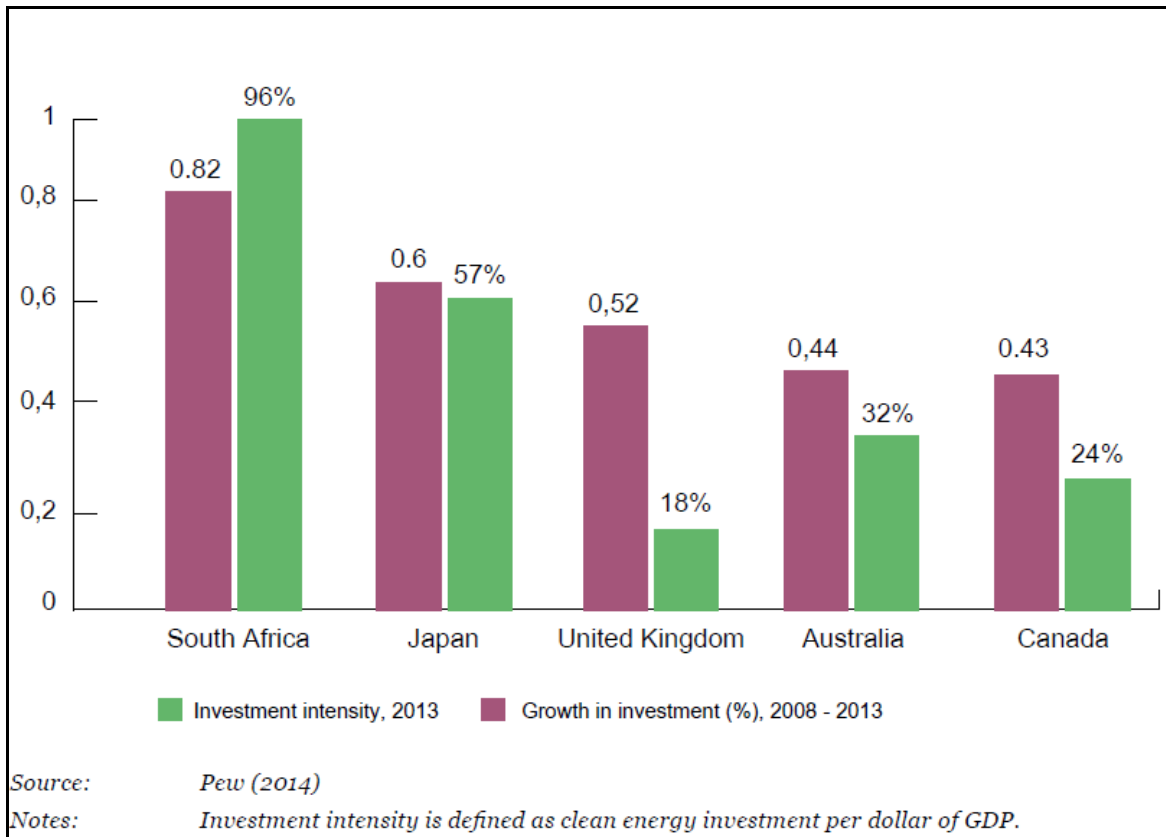


Figure 2.1: South Africa leads as a clean energy investment destination

With regard to local economic development, the REIPPPP sets out various local economic development requirements with stipulated minimum threshold and aspirational targeted levels, which each bidder must comply with. Based on the Broad-Based Black Economic Empowerment Codes, this requirement comprises the following components which make up a scorecard:

- Ownership by black people and local communities.
- Job creation.
- Local content.
- Management control.
- Preferential procurement.
- Enterprise development.
- Socio-economic development.

The final award is based on a combined evaluation in which price determines 70% of the ranking and performance on the local economic development scorecard the remaining 30%. This gives non-price criteria a much heavier weighting than they would normally enjoy under Government's preferential procurement policy.

Job creation, local content and preferential procurement accounted for the bulk of possible points on the scorecard in REIPPPP Round 3. Consequently, a requirement to source goods and services locally is considered to be the central driver of project costs associated with local economic development. In terms of local content, the definition of local content is quite broad, being the value of sales less the costs associated with imports. However, through successive bidding rounds, the definition has become subject to more detailed definition, with an expanding list of exclusions and increased

targeting in terms of key components identified by the Department of Trade and Industry for local manufacturing. This has benefitted local manufacturers and suppliers.

The WWF study considers a low and high growth renewable energy scenario. The capital requirements for the low growth scenario are estimated at R474 billion over the period 2014-2030 (2014 Rand value), rising to R1.084 trillion in the high-growth scenario, in which 35 GW of capacity is built. Each annual round of purchasing 2 200 MW of RE capacity would cost approximately R77 billion in 2014 Rand value terms. In relative economic terms, this equates to 2% of the GDP per annum or approximately one quarter of Government's planned annual investment in infrastructure over the medium term. In the low economic growth scenario, which is arguably the more realistic one, the average annual new liability over the period is approximately R40 billion.

The study also points out that infrastructure spend is more beneficial than other government expenditure due to the infrastructure multiplier effect. This refers to the beneficial impact of infrastructure on economic growth in both the short term, resulting from expansion in aggregate demand, as well as in the longer term (six to eight years) due to enhanced productive capacity in the economy. A recent USA study on highway expenditure revealed the infrastructure multiplier to be a factor of two on average, and greater during economic downturns (Leduc & Wilson 2013). This means that one dollar spent on infrastructure raises GDP by two dollars. If the same were to hold true, as similar analysis suggests it would (Kumo 2012, Ngandu et al 2010), this indicates that the construction of renewable energy plants could be a valuable economic growth driver at a time when fears of recession abound.

The report concludes that the WWF is optimistic that South Africa can achieve a much more promising clean energy future than current plans allow for. With an excellent solar resource and several good wind-producing pockets, the country is an ideal candidate for a renewable energy revolution.

The report indicates that the levelised cost of producing renewable energy already competes favourably with the three main alternatives, namely coal, gas and nuclear. In addition, renewable energy would contribute to a more climate-resilient future and insulate South Africa from dependence on expensive and unreliable fuel sources priced in dollars. Critical from a planning perspective, the report notes that renewable energy can also provide added flexibility on an 'as needed' basis, as electricity demand grows. This is vital in a highly uncertain environment.

2.4.5 The impact of the green economy on jobs in South Africa

The paper notes that greening the economy is particularly important in South Africa for two basic reasons: (1) the exceptional level of unemployment that the country is experiencing and (2) the high carbon impact of the economy.

In terms of employment, the paper refers to the IDC *Green Jobs Report* (2011). In summary, the short-term (next 2 years) estimate of total net employment potential is 98 000 jobs, and the long-term (next 8 years) employment potential is 462 567 jobs. Natural resource management is predicted to lead to the greatest number of these at 232 926 long-term jobs. Green energy generation is estimated to produce 130 023 long-term jobs, with energy and resource efficiency measures adding another 67 977 long-term jobs.

The paper notes that the Green Jobs Report was prepared by seventeen primary researchers from three prominent organisations, namely the IDC, the Development Bank of South Africa, and Trade and Industrial Policy Strategies. Many role players from other organisations were also consulted, including the World Wide Fund for Nature, the Green Building Council, the Economic Development Department and private companies involved in green industries.

Despite questions surrounding the employment estimates contained in the Green Jobs Report, green economic activity does appear to generate more local jobs than fossil-fuel-based industries. Some of the estimates also indicate the potential for significant employment. The paper concludes that the figures represent a promising starting point that warrants further research and policy involvement in greening the economy in South Africa.

2.4.6 The potential for local community benefits from wind farms in South Africa⁶

In her thesis, Tait⁷ notes that the distributed nature of renewable energy generation can induce a more geographically dispersed pattern of development. As a result, RE sites can be highly suited to rural locations with otherwise poor potential to attract local inward investment therefore enabling to target particularly vulnerable areas.

In her conclusion, Tait notes that the thesis has found positive evidence for the establishment of community benefit schemes in the wind sector in South Africa. These benefits would also apply to solar projects. The BBBEE requirements for developers as set out in the DoE's IPPPP for renewables is the primary driver for such schemes. The procurement programme, in keeping with the objective of maximising the economic development potential from this new sector, includes a specific focus on local communities in which wind farms are located.

The procurement programme, typical of all Government tendering processes, includes a BBBEE scorecard on which renewable energy projects are evaluated. However, the renewables scorecard appears to play an important part in a renewed focus on the broad-based Aspects of the legislation, as enforced by a recent national review of the BBBEE Act. In this regard, the renewables scorecard includes specifications for local communities in respect of broad-based ownership schemes, socio-economic development and enterprise development contributions. This approach to legislating social responsibilities of business in all sectors definitely has a South African flavour, borne out of the political history of the country and the imperatives for social transformation laid out in the constitution.

While Tait notes that it is still early days for the development of this sector and one cannot determine the impact that such benefit schemes may have, it is clear though that targeted development expenditure will be directed to multiple rural communities and there seems to be a strong potential to deliver socio-economic benefits.

⁶ Similar benefits are also likely to be associated with solar energy projects.

⁷ The potential for local community benefits from wind farms in South Africa, Louise Tait (2012), Master's Thesis, Energy Research Centre University of Cape Town

2.5 INTERNATIONAL EXPERIENCE WITH WIND FARMS

Three documents were reviewed, namely:

- National Wind Farm Development Guidelines produced by the Environment Protection and Heritage Council (EPHC) of Australia (Draft, July, 2010). The guidelines highlight the potential social and biophysical impacts associated with WFs. Given the similarities between South Africa and Australia, such as large, unobstructed landscapes and climates, these guidelines are regarded as relevant to the South Africa situation.
- Research on wind energy development in Scotland undertaken by Warren and Birnie in 2009 (Warren, Charles R. and Birnie, Richard V.(2009) 'Re-powering Scotland: Wind Farms and the 'Energy or Environment?' Debate'). The Scottish experience is also regarded as relevant to the South Africa context for a number of reasons. Firstly, installed wind power capacity has expanded rapidly in Scotland over the past decade. Before 1995 no wind farms existed. By late 2008, there were 59 operational onshore wind farms, 65 consented to or under construction and a further 103 in the planning process (BWEA, 2008). South Africa faces a similar situation, with a rush of applicants seeking approval for WFs. Secondly, the impact on the landscape, specifically the Scottish Highlands, was one of the key concerns raised in Scotland. The impact on undeveloped, natural landscapes is also likely to become an issue of growing concern in South Africa.
- Review of the potential health impacts associated with wind farms undertaken by the Australian Health and Medical Research Council (July 2010).

It should be noted that the section is not specific to the site but merely a review of international literature.

Health related impacts

The potential health impacts typically associated with WFs include, noise, dust shadow flicker and electromagnetic radiation. The findings of a literature review undertaken by the Australian Health and Medical Research Council published in July 2010 indicate that there is no evidence of wind farms posing a threat to human health. The research also found that wind energy is associated with fewer health effects than other forms of traditional energy generation and may therefore in fact result in the minimisation of adverse health impacts for the population as a whole (WHO, 2004).

The overall conclusion of the review undertaken by the Australian Health and Medical Research Council (July, 2010) is that, based on current evidence, wind turbines do not pose a threat to health if planning guidelines are followed.

Landscape impacts

The guidelines also note that landscapes change over time, both naturally and through human intervention. In addition, landscape values, being subjective, change not only with time, but also from person to person. As a result there are a wide variety of opinions of what is valued and what is not. The perceptions by which we value landscapes are influenced by a range of factors such as visual, cultural, spiritual, environmental, and based on memories or different aesthetics (National Wind Farm Development Guidelines, DRAFT - July 2010).

The guidelines note that cumulative impacts need to be considered in relation to dynamic as well as static viewpoints. The experience of driving along a tourist road, for example, needs to be considered as a dynamic sequence of views and visual

impacts, not just as the cumulative impact of several developments on one location. The viewer may only see one wind farm at a time, but if each successive stretch of the road is dominated by views of a wind farm, then that can be argued to be a cumulative visual impact (National Wind Farm Development Guidelines, DRAFT - July 2010).

Cumulative impacts may be visual and aesthetic, but they can also occur in relation to non-visual values in the landscape. Non-visual values include sounds/noise, associations, memories, knowledge and experiences or other cultural or natural values. As an example, the Guidelines indicate that locating four wind farms in a valley previously best known for its historic wineries might change the balance of perception about the valley's associational character, irrespective of whether all four wind farms were sited in a single view shed (National Wind Farm Development Guidelines, DRAFT - July 2010).

In the Scottish case, the primary argument employed to oppose wind farms related to the impact on valued landscapes. As in the South African case, the visual impacts are exacerbated by the fact that the locations with the greatest wind resources are often precisely those exposed upland areas which are most valued for their scenic qualities, and which are often ecologically sensitive. The establishment of wind farms together with the associated service roads and infrastructure, transforms landscapes which are perceived to be natural into 'landscapes of power' (Pasqualetti et al., 2002, p. 3).

2.6 IMPACT OF WIND FARMS ON TOURISM

A review of international literature in the impact of wind farms was undertaken as part of the SIA. Three articles were reviewed, namely:

- Atchison, (April, 2012). Tourism Impact of Wind Farms: Submitted to Renewables Inquiry Scottish Government. University of Edinburgh.
- Glasgow Caledonian University (2008). The economic impacts of wind farms on Scottish tourism. A report prepared for the Scottish Government.
- Regeneris Consulting (2014). Study into the Potential Economic Impact of Wind Farms and Associated Grid Infrastructure on the Welsh Tourism Sector.

The most comprehensive appears to be a review undertaken by Professor Cara Aitchison from the University of Edinburgh in 2012 which formed part Renewable Energy Inquiry by Scottish Government. The research by Aitchison found that previous research from other areas of the UK has demonstrated that wind farms are very unlikely to have any adverse impact on tourist numbers (volume), tourist expenditure (value) or tourism experience (satisfaction) (Glasgow Caledonian University, 2008; University of the West of England, 2004). In addition, to date, there is no evidence to demonstrate that any wind farm development in the UK or overseas has resulted in any adverse impact on tourism. In conclusion, the findings from both primary and secondary research relating to the actual and potential tourism impact of wind farms indicate that there will be neither an overall decline in the number of tourists visiting an area nor any overall financial loss in tourism-related earnings as a result of a wind farm development. The study by the Glasgow Caledonian University (2008) found that only a negligible fraction of tourists will change their decision whether to return to Scotland as a whole because they have seen a wind farm during their visit.

The study also found that 51.0% of respondents indicated that they thought wind farms could be tourist attractions. In this regard the visitor centre at the Whitelee Wind Farm in east Ayrshire Scotland run by ScottishPower Renewables has become one of the most popular 'eco-attractions' in Scotland, receiving 200 000 visitors since it

opened in 2009. The potential impact of the proposed WEF on the perceptions of visitors, specifically international visitors, has been raised by owners of adjacent game farming operations.

2.7 IMPACT ON WIND FARMS ON PROPERTY VALUES

The literature review undertaken as part of the SIA does not constitute a property evaluation study and merely seeks to comment on the potential impact of wind farms on property values based on the findings of studies undertaken overseas. The literature reviewed was based on an attempt by the authors of the SIA to identify what appear to be “scientifically” based studies that have been undertaken by reputable institutions. In this regard it is apparent that there are a number of articles available on the internet relating to the impact of wind farms on property values that lack scientific vigour. The literature review also sought to identify research undertaken since 2010. The literature review does not represent an exhaustive review.

In total five articles were identified and reviewed namely:

- Stephen Gibbons (April, 2014): Gone with the wind: Valuing the Visual Impacts of Wind turbines through house prices. London School of Economics and Political Sciences & Spatial Economics Research Centre, SERC Discussion Paper 159.
- Review of the Impact of Wind Farms on Property Values, Urbis Pty Ltd (2016): Commissioned by the Office of Environment and Heritage, NSW, Australia.
- Yasin Sunak and Reinhard Madlener (May 2012): The Impact of Wind Farms on Property Values: A Geographically Weighted Hedonic Pricing. School of Business and Economics / E.ON Energy Research Center, RWTH Aachen University. Model Working Paper No. 3/2012.
- Martin D. Heintzelman and Carrie M. Tuttle (March 3, 2011): Values in the Wind: A Hedonic Analysis of Wind Power Facilities. Economics and Financial Studies School of Business, Clarkson University.
- Ben Hoen, Jason P. Brown, Thomas Jackson, Ryan Wiser, Mark Thayer and Peter Cappers (August 2013): A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States. Ernest Orlando Lawrence Berkeley National Laboratory.

Three of the articles indicate that wind farms have the potential to impact on property values, while two indicate that the impacts are negligible and or non-existent.

In terms of the proposed project the most relevant study is the Urbis study (2016). The authors of the study found that appropriately located wind farms within rural areas, removed from higher density residential areas, are unlikely to have a measurable negative impact on surrounding land values.

SECTION 3: OVERVIEW OF STUDY AREA

3.1 INTRODUCTION

Section 3 provides a baseline description of the study area with regard to:

- The administrative context.
- Provincial context.
- Overview of district and local municipalities.
- Site and the surrounding land uses.

3.2 ADMINISTRATIVE CONTEXT

The study area is located within the Ubuntu Local Municipality (ULM), which forms part of the Pixley Ka Seme District Municipality (PKSDM) (Figure 3.1). The PKSDM is made up of eight category B local municipalities which include Emthanjeni, Kareeberg, Thembelihle, Siyathemba, Renosterberg, Ubuntu, Siyancuma and Umsobomvu municipalities (Figure 3.2). The town of Victoria West is the administrative seat of the ULM. The project area is located in Ward 3 of the ULM.

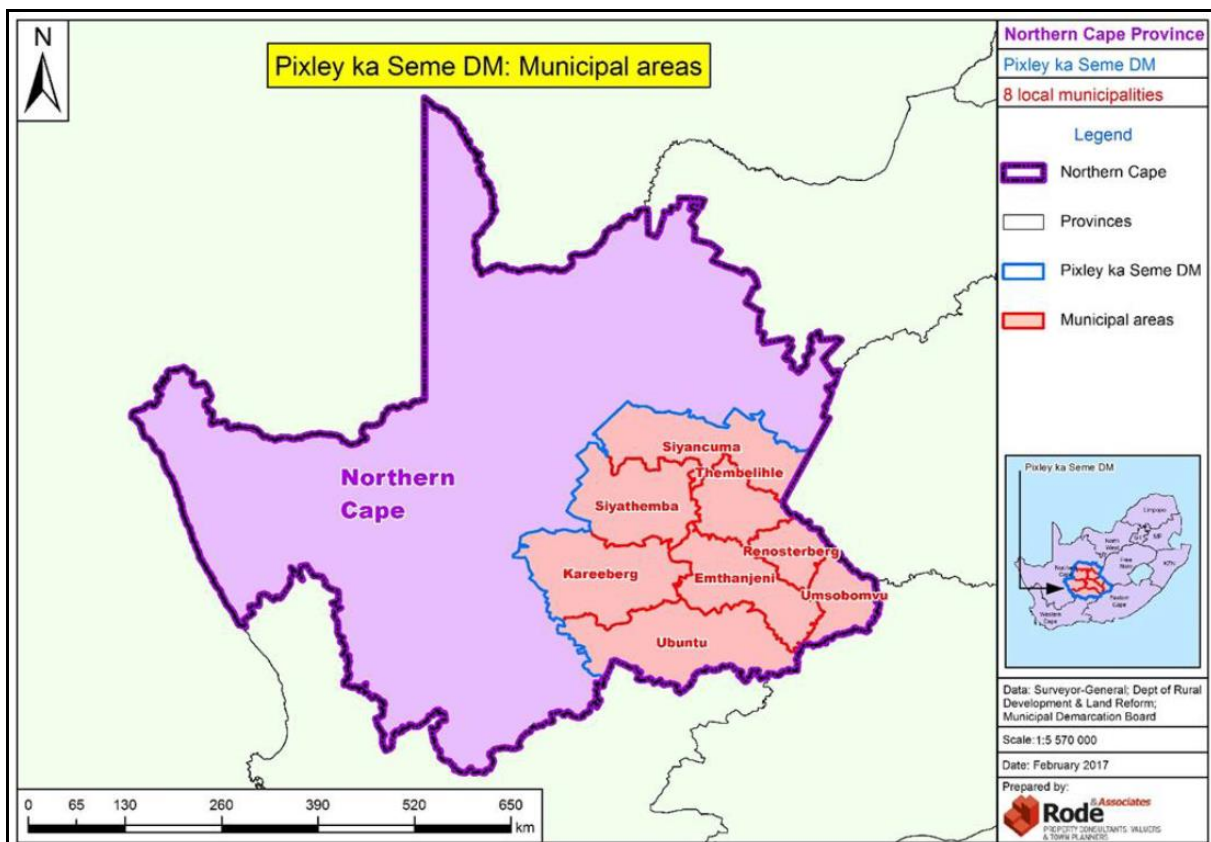


Figure 3.1: Location of Pixley Ka Seme District Municipality within the Northern Cape Province

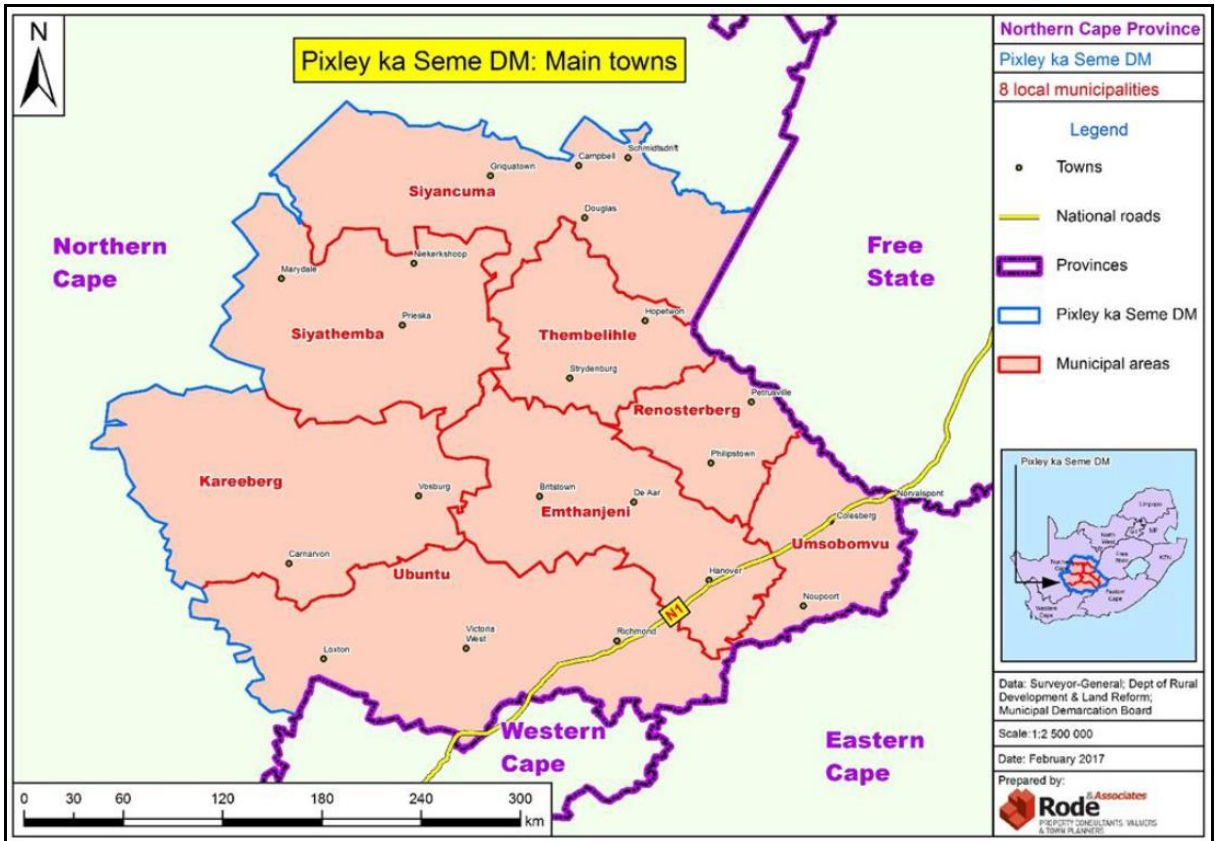


Figure 3.2: Location of Ubuntu Local Municipality within the Pixley Ka Seme District Municipality

3.3 PROVINCIAL CONTEXT⁸

The proposed site located in the Northern Cape Province, which is the largest province in South Africa and covers an area of 361 830 km² and, constitutes approximately 30% of South Africa. The province is divided into five district municipalities (DM), namely, Frances Baard, Karoo, Namakwa, Pixley Ka Seme and ZF Mgcawu District Municipality (known before 1 July 2013 as Siyanda DM). The site itself is located in the Pixley Ka Seme DM.

Population

Despite having the largest surface area, the Northern Cape has the smallest population of 1 193 780 (Community Household Survey, 2016) or 2.2% of the population of South Africa. Of the five districts, Frances Baard has the largest population (32.5%), followed by ZF Mgcawu District Municipality (21.2%), John Taola Gaetsewe (20.3%), Pixley ka Seme (16.4%) and Namakwa (9.7%). The majority of the population in the Northern Cape Province are Black African (48.1%), followed by Coloureds (43.7%) and Whites (7.7%).

In terms of age, 36.5% of the Northern Cape population is between 15 and 34 years old, which is the highest age distribution, followed by 29.2% of those aged 35–64

⁸ The information in this section is based on the Northern Cape Provincial Growth and Development Strategy 2004-2014. This document does not include 2011 Census Data. Where possible data from the 2011 Census and 2016 Community Household Survey has been used to update the information.

years, while only 6.6% comprised those aged 65 years and older. Similarly, this pattern is also seen across all districts in the province. The district profile shows that the highest proportions of persons aged 15–34 years were recorded in Pixley Ka Seme, ZF Mgcawu and John Taolo Gaetsewe districts. The figures for these three districts were also above the provincial average of 36.5%. The proportion of persons aged 65 years and older was higher in Namakwa (9.5%) and Frances Baard (8.2%).

Education

Based on the information contained in the NCPSTF the average adult education attainment levels in the Northern Cape are lower than the adult education attainment levels of South Africa as a whole. Approximately 19.7% of the Northern Cape adults have no schooling in comparison to South Africa's 18.1%. The Northern Cape has the second lowest percentage of adult individuals (5.5%) that obtained a tertiary education in South Africa. The LED Strategy for the Northern Cape indicates that Pixley ka Seme has the lowest adult education attainment levels in the Northern Cape with 27.3% of the adult population having no form of schooling, whilst John Taolo Gaetsewe is second with 25.4% having no schooling. The highest number of the adult population with tertiary education (6.4%) is located in Frances Baard.

The Northern Cape also has the smallest portion (11.1%) of highly skilled formal employees in South Africa, while Gauteng has the highest (14.3%). Linked to this the Northern Cape has the second largest portion of semi and unskilled formal employees in the country. A lack of skilled people often results in both the public and the private sector being unable to implement planned growth strategies and achieve the desired productivity, service delivery and service quality (NCSDF, 2012).

Economic development

Over the past 8 years there has been little to no variance in the Human Development Index (HDI) figures for the Northern Cape, indicating no increase or decrease in the overall standard of living⁹. This trend is unlikely to change in the foreseeable future, mainly due to the marginal economic base of the poorer areas, and the consolidation of the economic base in the relatively better-off areas. It is important to note that the HDI for the Northern Cape (0.55) is substantially below the South African figure of 0.72. The HDI of 0.55 displays a pattern of semi-development, and there is a definite inequality between the different population groups, with the Whites having a higher development lifestyle than the African or Coloured groups.

The percentage of Northern Cape people living below the poverty line has decreased from 40% in 1995 to 27% in 2011, while the poverty gap has decreased from 11% in 1995 to 8% in 2011 (Figure 3.3). The goal set by the province is to decrease the percentage of people living below the poverty line to 20% by 2015 (NCSDF, 2012). The alleviation of poverty is one of the key challenges for economic development. Higher levels of economic growth are a key challenge for poverty eradication.

⁹ The Human Development Index (HDI) was developed by the United Nations Development Programme (UNDP) based on the philosophy that the goal of development was to ensure that individuals live long, informed and comfortable lives. The HDI consists of three components: Longevity, which is measured by life expectancy at birth; Educational attainment, which is measured by two education variables, namely adult literacy and combined gross primary, secondary and tertiary enrolment ratio, and; Income, which is measured by gross domestic product (GDP) per capita. Performance in each dimension is expressed as a value between 0 and 1, and the HDI index gives an internationally accepted measure of the wellness (quality of life) of the population of the area under consideration. The closer the HDI is to 1.0, the higher the level of "living condition". For example, Sweden has an index of 0.91 defined as high, South Africa at 0.72 is defined as middle and Lesotho at 0.47 is defined as low.

Investment in people is pivotal to the eradication of poverty and inequality. Investment in people is also, to a large extent, about delivering social and economic infrastructure for education, welfare, health, housing, as well as transport and bulk infrastructure.

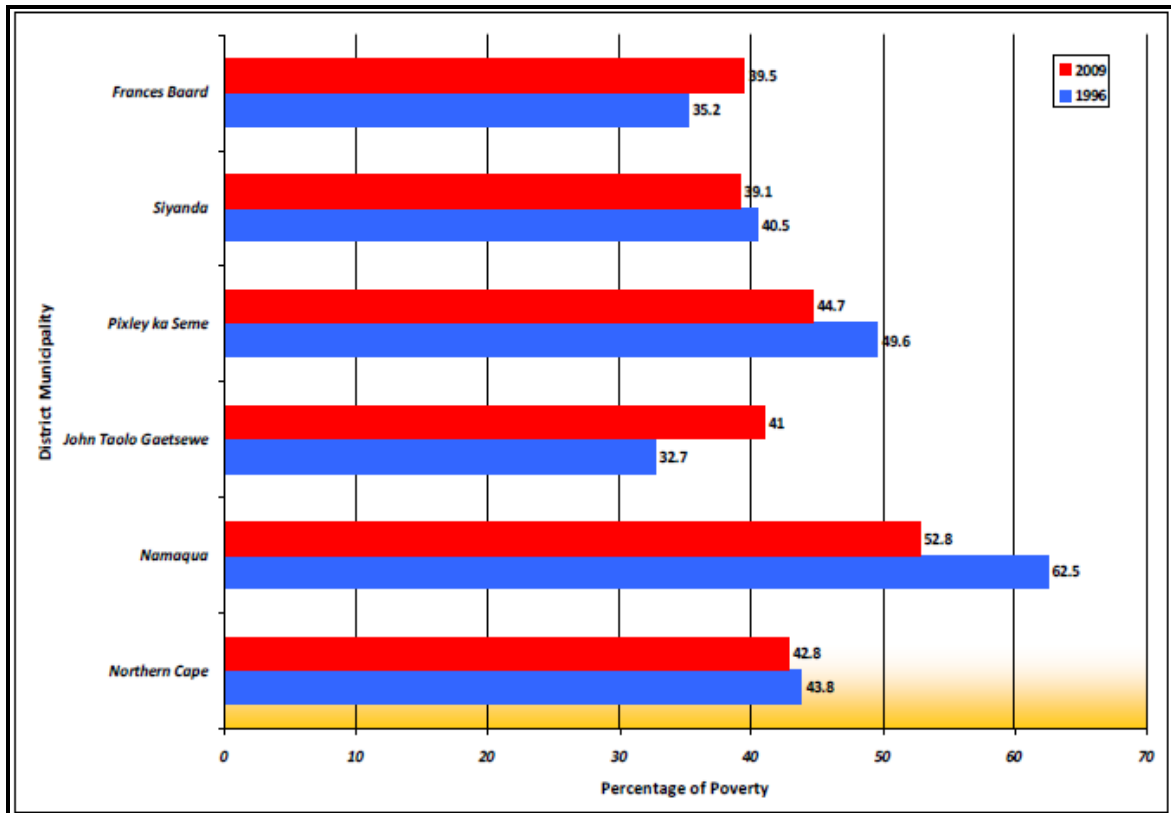


Figure 3.3: Percentage of people living in poverty in the Northern Cape (Source: Global Insight, 2009 as cited in the PGDS, July 2011)¹⁰.

In terms of per capita income, the Northern Cape Province has the third highest per capita income of all nine provinces, however, income distribution is extremely skewed, with a high percentage of the population living in extreme poverty. The measure used in the PGDS document to measure poverty is the percentage of people living below the poverty line or breadline is used¹¹.

Economic sectors

The Northern Cape economy has shown significant recovery since 2000/2001 when it had a negative economic growth rate of -1.5% (LED Strategy). The provincial economy reached a peak of 3.7% in 2003/2004 and remained the lowest of all provinces. The Northern Cape is the smallest contributing province to South Africa's economy (only 2% to South Africa GDP per region in 2007).

The mining sector is the largest contributor to the provincial GDP, contributing 28.9% to the GDP in 2002 and 27.6% in 2008. The mining sector is also important at a

¹⁰ Siyanda DM is now called the ZF Mgcawu DM.

¹¹ In terms of the poverty line, a person is considered poor if his or her consumption or income level falls below some minimum level necessary to meet basic needs. The minimum level is usually called the poverty line. In South Africa the poverty income level is set at R800/month for an individual or R 3 200 per month for a household of four.

national level. In this regard, the Northern Cape produces approximately 37% of South Africa’s diamond output, 44% of its zinc, 70% of its silver, 84% of its iron-ore, 93% of its lead and 99% if its manganese.

Agriculture and agri-processing sector is also a key economic sector. Approximately 2% of the province is used for crop farming, mainly under irrigation in the Orange River Valley and Vaalharts Irrigation Scheme. Approximately 96% of the land is used for stock farming, including beef cattle and sheep or goats, as well as game farming. The agricultural sector contributed 5.8% to the Northern Cape GDP per region in 2007 which was approximately R1.3 billion, and it employs approximately 19.5% of the total formally employed individuals (NCSD, 2012). The sector is experiencing significant growth in value-added activities, including game-farming. Food production and processing for the local and export market is also growing significantly.

The main agricultural produce of the Northern Cape include:

- High-value horticultural products such as table grapes, sultanas and wine grapes, dates, nuts, cotton, fodder, and cereal crops are grown along the Orange River.
- Wheat, fruit, groundnuts, maize and cotton in the Vaalharts irrigation scheme in the vicinity of Hartswater and Jan Kempdorp.
- Vegetables and cereal crops at the confluence of the Vaal River and the Orange Rivers in the vicinity of Douglas.
- Wool, mohair, karakul, Karoo lamb, ostrich meat and leather, and venison throughout most of the province.

Economic development in the Northern Cape is hampered by the vastness of the area and the remoteness of its communities in rural areas. Development is also hampered by the low education and skills levels in the province. As a result unemployment in the Northern Cape presents a major challenge.

Employment

According to Statistics South Africa Labour (2012) the community and social services sector is the largest employer in the province at 29%, followed by the agricultural sector (16%), wholesale and retail trade (14%), finance (8%) manufacturing (6%) and mining (6%), etc. (Figure 3.4).

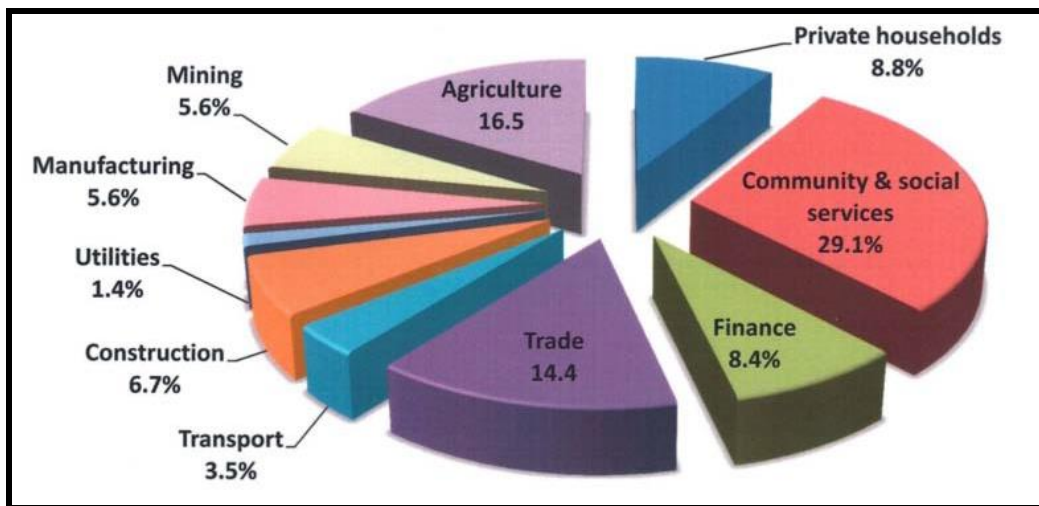


Figure 3.4: Employment by Economic Sector and Industry (Source: Statistics South Africa 2012).

3.4 DEMOGRAPHIC OVERVIEW

Population

The population of the ULM in 2016 was 19 471 (Community Household Survey 2016). Of this total, 38.6% were under the age of 18, 55.9% were between 18 and 64, and the remaining 5.5% were 65 and older. The population of Ward 3 in 2011 was 4 715. Of this total, 37% were under the age of 18, 58% were between 18 and 64, and the remaining 5% were 65 and older. The ULM and Ward 3 therefore have a high percentage of the population that fall within the economically active group of 18-65. The figures are similar to the figures for the PKSDM and Northern Cape (58.5% and 57.7% respectively).

The dependency ratio is the ratio of non-economically active dependents (usually people younger than 15 or older than 64) to the working age population group (15-64). The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates reduced revenue for local authorities to meet the growing demand for services. The national dependency ratio in 2011 was 52.7%, while the Northern Cape Province was 55.7%. The high provincial dependency ratio is also reflected at a local municipal and ward level. The traditional approach is based people younger than 15 or older than 64. The information provided provides information for the age group under 18. The total number of people falling within this age group will therefore be higher than the 0-15 age group. However, most people between the age of 15 and 17 are not economically active (i.e. they are likely to be at school).

Using information on people under the age of 18 is therefore likely to represent a more accurate reflection of the dependency ratio. Based on these figures, the dependency ratios for the ULM (2016) and Ward 3 (2011) were 79% and 72% respectively. Based on this approach the figures are similar to the figure for the Northern Cape (73.3%). The high dependency ratios reflect the limited employment and economic opportunities in the area.

In terms of race groups, Coloureds made up 73% of the population on the ULM, followed by Black Africans, 22.5% and Whites, 4.5%. In Ward 3, Coloureds made up 77.3% of the population, followed by Whites, 14.8% and Black Africans, 6.7%. The main first language spoken in both the ULM and Ward 3 was Afrikaans, 82.5% and 92.5% respectively.

Households and house types

There were a total number of 6 034 (2016) and 1 609 (2011) households in the ULM respectively. Of these 90.4% (ULM) and 92.4% (Ward 3) were formal houses. 6.6% of the structures in the ULM and 1.2% in Ward 3 were shacks. The majority of dwellings in the ULM and Ward 3 are therefore formal structures. The majority of the properties in the ULM (59.2%) were owned and fully paid off. In Ward 3 the majority of properties were occupied rent free. This figure reflects the rural nature of Ward 3 and the rent-free status of farm workers. Approximately 33.6% of the households in the ULM and 18.8% of the households in Ward 3 were headed by women. These figures are lower than the rate for the PKSDM (37%) and Northern Cape (39%). Despite the figures for the ULM being lower than the district and provincial averages, women headed households tend to be more vulnerable.

Household income

Based on the data from the 2011 Census, 11.7% of the population of the ULM had no formal income, 3.6% earned less than R 4 800, 6.2% earned between R 5 000 and R

10 000 per annum, 24.1% between R 10 000 and R 20 000 per annum and 24% between R 20 000 and 40 000 per annum (2016). For Ward 3, 5.9% of the population had no formal income, 2.5% earned less than R 4 800, 5.1% earned between R 5 000 and R 10 000 per annum, 30.9% between R 10 000 and 20 000 per annum and 29% between R 20 000 and 40 000 per annum (Census 2011).

The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household (~ 40 000 per annum). Based on this measure, in the region of 69.6% of the households in the ULM and 73.4% in Ward 3 live close to or below the poverty line. The low-income levels reflect the rural nature of the local economy and the limited formal employment opportunities outside in the area. This is also reflected in the high unemployment rates. The low-income levels are a major concern given that an increasing number of individuals and households are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the ULM. This in turn impacts on the ability of the ULM to maintain and provide services.

Household income levels are likely to have been impacted by the COVID-19 pandemic. The number of households in the ULM and Ward 3 that live close to or below the poverty line is likely to have increased over the last 18 months. This, coupled with the high dependency ratio, is a major cause of concern for the area.

Employment

The official unemployment rate in the ULM in 2011 was 18.1%, while 44.2% were employed, and 33.2% were regarded as not economically active. The figures for Ward 3 in 2011 were 6.8% unemployed, 62.5% employed and 28.4% not economically active. The unemployment rates for the ULM and Ward 3 are lower than the Provincial rate of 14.5% and the District rate of 14.8%. However, the COVID-19 pandemic is likely to have resulted in an increase in unemployment rates in both the ULM and Ward 3. Recent figures released by Stats South Africa also indicate that South Africa's unemployment rate is in the region of 36%, the highest formal unemployment rate in the world.

Education

In terms of education levels, the percentage of the population over 20 years of age in the ULM and Ward 3 with no schooling was 11.8% (2016) and 20.7% (2011) respectively, compared to 7.9% and 11.1% for the Northern Cape Province in 2016 and 2011 respectively. The percentage of the population over the age of 20 with matric was 23.2% and 15.6% respectively, compared to 29.1% (2016) and 25.2% (2011) for the Northern Cape. The lower education levels are linked to rural, isolated nature of the area.

3.5 MUNICIPAL SERVICES

Electricity

Based on 2016 survey, 84.7% of households in the ULM had in-house prepaid meters, while 6.6% had no access to electricity. No data was on electricity access was available for Ward 3.

Access to water

Based on the 2016 survey information, 89% of households in the ULM were supplied by a service provider, while 9.8% relied on their own sources. For Ward 3, 56% of households relied on boreholes, while 31.1% were provided with water by a local service provider and 6% from tankers (2011). This high reliance on boreholes reflects the rural nature on Ward 3.

Sanitation

87.6% of the households in the ULM had access to flush toilets (2016), while 4.1% relied on bucket toilets and 5.8% did not have access to formal sanitation. In Ward 3, only 55.7% of the households had access to flush toilets, while 15.4% relied on pit latrines and 21.7% had no form of formal sanitation (2011). The high percentage of households with no formal form of sanitation reflects the rural nature of Ward 3.

Refuse collection

82.6% of the households in the ULM had access to regular refuse removal service, while 7.5% disposed of their waste at their own dump and 5.1% used communal dumps (2016). In Ward 3, 20.4% of households had access to regular refuse removal service, 56.2% disposed of their waste at their own dump and 17.6% had not access to refuse removal services (2011). The lower figures for Ward 3 reflect the rural nature of the area and the difficulty of providing municipal services to areas located at a distance from the main towns in the area.

3.6 HEALTH, COMMUNITY AND SAFETY FACILITIES

In terms of health care facilities, there is a hospital and clinic in Victoria West and Richmond, and also a clinic in Loxton (Table 3.1). The key issues facing the health services in the area include:

- Inadequate health facilities.
- Limited medical staff (Doctors & Nurses).
- Limited equipment.
- Shortage of ambulances

Table 3.1: Health Facilities in ULM

Health Facilities	Clinic	Hospital	Ambulance Facilities
Victoria West	1	1	Yes
Richmond	1	1	Yes
Loxton	1	0	0
Hutchinson	0	0	0
Merriman	0	0	0
Total	3	2	2

The public facilities include libraries in all of the towns, except Merriman. There are also community halls in the larger towns (Table 3.2).

Table 3.2: Community Facilities in ULM

Towns	Cemeteries	Libraries	MPCC	Community Halls	Recreational Facilities	Museums
Victoria West	4 private & 1 public	2	-	3	1 caravan park	1
Richmond	2 public & 1 private	1 private & 1 public	-	3	1 park & 1 caravan park	1
Loxton	1 public & 1 private	1	-	1	1 park & 1 caravan park	-
Merriman	1 private	-	-	--	-	-
Huchinson	1 public	1	-	-	-	-
Farms	-	2	-	-	-	-
Ubuntu LM	12	8	0	7	5	2

The key issues identified in the IDP include:

- Inadequate recreational facilities in all the towns.
- Poor maintenance

In terms of safety and security all three of the main towns have police stations (Table 3.3). There are also magistrate and district courts in Victoria West and Richmond.

Table 3.3: Safety and security facilities in ULM

Towns	Police stations	Magistrate court	District court
Victoria west	1	1	1
Richmond	1	1	1
Loxton	1	-	-
Total	3	2	2

The key issues identified in the IDP include:

- Need for satellite police stations in townships.
- Shortage of police staff and vehicles.
- Shortage of magistrates

3.7 ECONOMIC OVERVIEW

Agriculture

Agriculture is the key economic sector in the PKSDM and ULM. Many of the towns within the district municipal area function mainly as agricultural service centres, with the level of services provided at the centres to a large extent reliable on the intensity of the farming practices in the surrounding area.

Despite the largely semi-arid and arid environment in the district, the fertile land that lies alongside the Orange, Vaal and Riet Rivers supports the production of some of the country's finest quality agricultural products, including grapes and vegetables. The main livestock farming in the region include cattle, sheep and goat farming. Game breeding has also been identified as one of the opportunities which could be linked with the tourism sector for Game reserves and hunting activities.

However, despite the key role played by agriculture there is limited value adding to the farming products within the district and the area is prone to droughts and climate change.

Mining

The main deposits in Pixley ka Seme include alluvial diamond mining along the Orange River and various semi-precious stones, such as tiger-eye and zinc deposits. The region also has various saltpans for the potential of salt production. Uranium deposits also occur in the district.

Tourism

The tourism sector in the district contributes 15.6% to the provincial gross value added (GVA). The municipalities Emthanjeni, Kareeberg, Umsobomvu and Siyancuma municipalities are the biggest contributors to the provincial gross value added (GVA). The PKSDM IDP notes that the tourism opportunities in the district will increase due to the Karoo Array Telescope (KAT), a project being driven at a national level. Of relevance, the PKSDM notes that care needs to be taken with developments that have the potential to negatively impact on the Karoo landscapes.

Renewable energy

Of key relevance the PKSDM IDP identifies renewable energy as key economic sector and refers to the substantial socio-economic development (SED) and enterprise development (ED) contributions leveraged by the IPPPP commitments. The IDP notes that the towns of Prieska and Carnarvon have in recent years changed character from small rural towns to potentially regional hubs as a result of investments in renewable energy generation and the Square Kilometre Array (SKA) radio telescope project, respectively.

3.8 OVERVIEW OF STUDY AREA¹²

The Great Karoo Renewable Energy Cluster is located to the north of the N1, between Three Sisters and Richmond. The closest towns to the site are Richmond, which is located approximately 22 km from the eastern boundary of the site, and Victoria West, which is located approximately 30 km (as the crow flies) north west of western boundary of the site. The bulk of the site is located to the north of the N1 with a small portion located to the south (Figure 3.5).

The town of Richmond was established in 1843 when a new congregation was formed for the area. The town was named after the Duke of Richmond from Kent, who was the father-in-law of the Governor of the Cape at that time, Sir Peregrine Maitland. Historically the town served as resort town for European aristocratic tuberculosis patients in the 1800s due to its clean air and mineral rich waters. The PKSSD SDF identifies Richmond as an Urban Satellite Town. These are towns that already have some services and infrastructure and have the potential to grow. The economy of the town is linked to providing services to the surrounding farming areas and through traffic associated with the N1.

The town of Victoria West was named after Queen Victoria of England and established in 1843. Victoria West forms the starting point of the Diamond Way and lies on the main route from Cape Town to Kimberley. Diamond fever was sparked in 1866 with the discovery at Hopetown and then at Kimberley. The PKSSD SDF identifies Victoria

¹² The overview of the study area will be updated following the site visit during the Assessment Phase

West as an Urban Centre. These towns are administrative centres within the respective eight municipalities in the district. These centres' administrative functions should be further enhanced, and it is recommended that programs for urban rehabilitation of these centres should focus on the stimulation of economic growth in these areas. The economy of the town is linked to providing services to the surrounding farming areas and through traffic associated with the N12 and R63.

The landscape associated with the site is a typical Karoo landscape consisting of dolerite koppies and ridges separated by valley bottoms. The land uses are linked to livestock farming. The character of the area can be described as a rural, Karoo landscape. There are a number of farm dwellings located in the vicinity of the site, including three farm dwellings within the boundary of the site. As indicated in Figure 3.6, most of the farm dwellings are located in the area to the west and north of the site. The Rondavel Guest Farm is located adjacent to the N1, within the boundary of the site.



Figure 3.5: Location of Great Karoo Renewable Energy Cluster (Red Arrow)



Figure 3.6: Location of farm dwellings (place marks) in relation to the Great Karoo Renewable Energy Cluster area (grey outline).

SECTION 4: OVERVIEW OF KEY SOCIAL ISSUES

4.1 INTRODUCTION

Section 4 provides an overview of key social issues identified that will be assessment during the Assessment Phase. The identification of key issues was based on:

- Review of project related information.
- Experience/ familiarity of the author with the area and local conditions.
- Experience with similar projects.

The section is divided into the following sections:

- Compatibility with relevant policy and planning context ("planning fit");
- Social issues associated with the construction phase.
- Social issues associated with the operational phase.
- Social issues associated with the decommissioning phase.
- Social implications of "no development" alternative.
- Social implications associated with cumulative impacts.

4.2 ASSESSMENT OF POLICY AND PLANNING FIT

The development of renewable energy is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The PKSDM SDF and IDP and ULM IDP also support the development of renewable energy. The development of the proposed REF is therefore supported by key policy and planning documents.

4.3 CONSTRUCTION PHASE SOCIAL IMPACTS

Potential positive impacts

- Creation of employment and business opportunities, and opportunity for skills development and on-site training.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of job-seekers.
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
- Increased risk of grass fires associated with construction related activities.
- Nuisance impacts, such as noise, dust and safety, associated with construction related activities and vehicles.
- Impact on productive farmland.

4.3.1 Creation of local employment, training, and business opportunities

The construction phase of 140 MW WEF will extend over a period of approximately 18-24 months and create in the region of 350 employment opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. Based on information from similar projects the total wage bill will be in the region of R 31 million (2021 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit.

The capital expenditure associated with the construction phase will be approximately R 2 billion (2021 Rand value). Due the lack of diversification in the local economy the potential for local companies is likely to be limited. The majority of benefits are therefore likely to accrue to contractors and engineering companies based outside the ULM. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site. The hospitality industry in the area will also benefit from the provision of accommodation and meals for professionals (engineers, quantity surveyors, project managers, product representatives etc.) and other (non-construction) personnel involved on the project. Experience from other construction projects indicates that the potential opportunities are not limited to on-site construction workers but also to consultants and product representatives associated with the project.

Table 4.1: Impact assessment of employment and business creation opportunities during the construction phase

Nature: Creation of employment and business opportunities during the construction phase			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Creation of employment and business opportunities during the construction phase	<u>Direct impacts:</u> » Creation of temporary employment opportunities » Creation of business and procurement opportunities <u>Indirect impacts:</u> » Support for local economy. » Creation of training and skills development opportunities	Local-Regional	N/A
Description of expected significance of impact Evidence from the other renewable energy projects indicates that the construction phase of 140 MW WEF will extend over a period of approximately 18-24 months and create in the region of 350 employment opportunities. Members from the local communities in the area, specifically Victoria West and Richmond, would be in a position to qualify for most of the low skilled and semi-skilled opportunities. The business-related opportunities will be linked to the hospitality (accommodation) and services sector (catering, security, transport etc.).			
Gaps in knowledge & recommendations for further study » Collection of information on local skills and education levels. » Collection of information on local hospitality and services sector.			
Recommendations with regards to general field surveys » Site visit and interviews with representatives from local municipality, and the hospitality and services sector.			

» Site visit and interviews with local chamber of commerce.

4.3.2 Impact of construction workers on local communities

The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly of male construction workers, including:

- An increase in alcohol and drug use.
- An increase in crime levels.
- The loss of girlfriends and/or wives to construction workers.
- An increase in teenage and unwanted pregnancies.
- An increase in prostitution.
- An increase in sexually transmitted diseases (STDs), including HIV.

The proponent has indicated that workers will be accommodated on site.

The objective will be to source as many of the low and semi-skilled workers locally. These workers will be from the local community and form part of the local family and social networks. This will reduce the risk and mitigate the potential impacts on the local community. The potential impact on the local community will therefore be negligible. The balance of semi-skilled and skilled workers will be accommodated in the nearby towns of Victoria West and Richmond.

Table 4.2: Assessment of impact of the presence of construction workers in the area on local communities

Nature: Potential impacts on family structures and social networks associated with the presence of construction workers			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential impacts on family structures and social networks associated with the presence of construction workers	<u>Direct impacts:</u> <ul style="list-style-type: none"> » Disruption of existing family structures and social networks » Anti-social behaviour of construction workers » Increase in substance abuse, crime, sexually transmitted diseases. » Unplanned pregnancies <u>Indirect impacts:</u> <ul style="list-style-type: none"> » Impact on psychological well-being of local communities. » Resentment of outsiders and tension within local communities 	Local-Regional	N/A
Description of expected significance of impact			
Evidence from the other renewable energy projects indicates that presence and behaviour of			

construction workers can impact negatively on local communities. Members from the local communities in the area, specifically Victoria West and Richmond, would be at potential risk depending on where non-local construction workers are accommodated during the construction phase.

Gaps in knowledge & recommendations for further study

- » Collection of information on local skills and education levels. Employing local community members reduces the potential risks
- » Collection of information on accommodation options and capacity.
- » Collection of information on existing community challenges and needs.

Recommendations with regards to general field surveys

- » Site visit and interviews with representatives from local municipality and community representatives.
- » Site visit and interviews with representatives from hospitality sector with regard to accommodation options.

4.3.3 Influx of job seekers

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become “economically stranded” in the area or decide to stay on irrespective of finding a job or not. While the proposed project on its own does not constitute a large construction project, the establishment of a number of renewable energy projects in the area may attract job seekers to the area. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the way in which they conduct themselves can impact on the local community. The main areas of concern associated with the influx of job seekers include:

- Impacts on existing social networks and community structures.
- Competition for housing, specifically low-cost housing.
- Competition for scarce jobs.
- Increase in incidences of crime.

These issues are similar to the concerns associated with the presence of construction workers and are discussed in Section 4.4.2. The potential for economically motivated in-migration and subsequent labour stranding is likely to be negligible. This is due to the isolated location of the area and the limited economic and employment opportunities in the nearby towns of Victoria West and Richmond.

Table 4.3: Assessment of impact of job seekers on local communities

Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential impacts on family structures, social networks and community services associated with the influx of job seekers	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> » Disruption of existing family structures and social networks » Anti-social behaviour of construction workers » Increase in substance abuse, crime, sexually transmitted diseases. » Unplanned pregnancies » Pressure on local services <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> » Impact on psychological well-being of local communities. » Resentment of outsiders and tension within local communities 	Local-Regional	N/A
<p>Description of expected significance of impact Evidence from the other renewable energy projects indicates that the construction phase can result in the influx of jobseekers to the area and that this has the potential to impact negatively on local communities. However, the potential for the influx of jobseekers is also influenced by the location of the project. Projects located in relatively remote, rural areas are less likely to attract jobseekers</p>			
<p>Gaps in knowledge & recommendations for further study » Collection of information on existing community challenges and needs.</p> <p>Recommendations with regards to general field surveys » Site visit and interviews with representatives from local municipality and community representatives.</p>			

4.3.4 Risk to safety, livestock, and farm infrastructure

The presence on and movement of construction workers on and off the site poses a potential safety threat to local farmers and farm workers in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged, or stock theft linked either directly or indirectly to the presence of construction workers on the site. The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by careful planning and managing the movement of construction workers on and off the site workers during the construction phase.

Table 4.4: Assessment of risk to safety, livestock, and damage to farm infrastructure

Nature: Potential risk to farmers and farm workers, livestock and damage to farm infrastructure associated with the presence and activities of construction workers on site			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential risk to safety of scholars, farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site	<u>Direct impacts:</u> » Damage of gates, fences, etc. » Injuries to and loss of livestock » Break-ins, and theft of from local farms. » Damage of local farm roads. <u>Indirect impacts:</u> » Exposure to outside people of farming operations and risk to farming operations. » Increased risk of stock-theft.	Local	N/A
Description of expected significance of impact Evidence from the other renewable energy projects indicates that the movement and activities of construction workers can impact on farming operations. The impacts include damage to fences and gates, gates being left open resulting in loss of livestock, increased risk of petty theft and stock theft etc.			
Gaps in knowledge & recommendations for further study » Collection of information on existing farming operations and activities.			
Recommendations with regards to general field surveys » Site visit and interviews with local farmers and representatives from local farming associations etc.			

4.3.5 Increased risk of grass fires

The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could, in turn pose, a threat to livestock, crops, wildlife and farm infrastructure. The potential risk of grass fires will be higher during the dry, windy winter months from May to October. The impacts will be largely local and can be effectively mitigated.

Table 4.5: Assessment of impact of increased risk of grass fires

Nature: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires	<u>Direct impacts:</u> » Damage of structures, grazing, gates, fences, etc. » Injuries to and loss of livestock <u>Indirect impacts:</u> » Impact on stocking levels	Local	N/A

	and future farming operations. » Increased risk of stock losses and theft.		
Description of expected significance of impact Evidence from the other renewable energy projects indicates that the activities associated with the construction phase can increase the risk of grass fires, which in turn can impact on farming operations. The impacts include loss of grazing, damage to structures, fences, and gates, etc. These impacts impact on the livelihood of farmers.			
Gaps in knowledge & recommendations for further study » Collection of information on existing farming operations and activities, and risk of grass fires in the area.			
Recommendations with regards to general field surveys » Site visit and interviews with local farmers and representatives from local farming associations etc.			

4.3.6 Nuisance impacts associated with construction related activities

Construction related activities, including the movement of heavy construction vehicles of and on the site, has the potential to create dust, noise and safety impacts and damage roads. The impacts will be largely local and can be effectively mitigated.

Table 4.6: Assessment of the impacts associated with construction related activities

Nature: Potential noise, dust and safety impacts associated with construction related activities			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential noise, dust and safety impacts associated with construction related activities	<u>Direct impacts:</u> » Dust impacts, and impact on quality of life and also crops and grazing. » Noise impacts, and impact on quality of life. » Safety of farmers due to movement of construction vehicles » Damage of local farm roads. <u>Indirect impacts:</u> » Limited indirect impacts	Local	N/A
Description of expected significance of impact Evidence from the other renewable energy projects indicates that the activities associated with the construction phase do result in dust, noise and safety impacts that can impact on local farmers and farm workers.			
Gaps in knowledge & recommendations for further study » Collection of information on existing farming operations and activities.			
Recommendations with regards to general field surveys » Site visit and interviews with local farmers and representatives from local farming associations etc.			

4.3.7 Impacts associated with loss of farmland

The activities associated with the construction phase and establishment of the proposed project and associated infrastructure will result in the disturbance and loss of land available for grazing. The impact on farmland associated with the construction phase can be mitigated by minimising the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase. In addition, the landowner will be compensated for the loss of land.

Table 4.7: Assessment of impact on farmland due to construction related activities

Nature: The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the project etc. will damage farmlands and result in a loss of farmlands for grazing.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Damage to farmland and loss of grazing and or crops	<u>Direct impacts:</u> » Loss of grazing and or crops <u>Indirect impacts:</u> » Impact on future farming operations. » Impact on employment opportunities on the farm.	Local	N/A
Description of expected significance of impact Evidence from the other renewable energy projects indicates that the activities associated with the construction phase will result in the loss of farmland, including grazing and or crops depending on the location. These impacts impact on the livelihood of farmers. However, loss of land and crops can be addressed by minimising the disturbance footprint and compensation for losses.			
Gaps in knowledge & recommendations for further study » Collection of information on existing farming operations and activities.			
Recommendations with regards to general field surveys » Site visit and interviews with local farmers and representatives from local farming associations etc.			

4.4 OPERATIONAL PHASE SOCIAL IMPACTS

The following key social issues are of relevance to the operational phase:

Potential positive impacts

- The establishment of infrastructure to improve energy security and support renewable sector.
- Creation of employment opportunities.
- Benefits to the affected landowners.
- Benefits associated with the socio-economic contributions to community development.

Potential negative impacts

- Visual impacts and associated impacts on sense of place.
- Impact on property values.
- Impact on tourism.

4.4.1 Improve energy security and support the renewable energy sector

The primary goal of the proposed project is to improve energy security in South Africa by generating additional energy. The proposed WEF also reduces the carbon footprint associated with energy generation. The project should therefore be viewed within the context of the South Africa's current reliance on coal powered energy to meet the majority of its energy needs, and secondly, within the context of the success of the REIPPPP.

Table 4.8: Improve energy security and support renewable sector

Nature: Development of infrastructure to improve energy security and support renewable sector			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Improve SAs energy security and reduce reliance on coal	<u>Direct impacts:</u> » Improve energy security » Reduce reliance on coal. » Support renewable energy <u>Indirect impacts:</u> » Address climate change impacts	Local-International	N/A
Description of expected significance of impact			
South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. A review of the REIPPPP and establishment of renewable energy facilities not only addresses environmental issues associated with climate change and consumption of scarce water resources, but also create significant socio-economic opportunities and benefits, specifically for historically disadvantaged, rural communities.			
Gaps in knowledge & recommendations for further study			
» Collection and review of information on REIPPPP.			
Recommendations with regards to general field surveys			
» N/A. Desktop review of REIPPPP.			

4.4.2 Creation of employment opportunities

The proposed development will create in the region of 20 full time employment opportunities during the operational phase, of which 70% will be unskilled, 25% semi-skilled 25%, and 5% skilled 5%. Based on similar projects the annual operating budget will be in the region of R 24 million (2021 Rand values), including wages.

Table 4.9: Assessment of employment and business creation opportunities

Nature: Creation of employment and business opportunities associated with the operational phase			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Creation of employment and business opportunities associated with the operational phase	<u>Direct impacts:</u> » Creation of employment opportunities » Creation of business and procurement opportunities <u>Indirect impacts:</u>	Local-Regional	N/A

	<ul style="list-style-type: none"> » Support for local economy. » Creation of training and skills development opportunities 		
<p>Description of expected significance of impact</p> <p>The direct employment opportunities associated with the operational phase of renewable energy projects are relatively limited. However, a review of the REIPPPP indicates that the benefits associated with the operation of renewable energy projects are significant and extend beyond direct employment opportunities.</p>			
<p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> » Collection and review of information on REIPPPP. <p>Recommendations with regards to general field surveys</p> <ul style="list-style-type: none"> » N/A. Desktop review of REIPPPP. 			

4.4.3 Generate income for affected landowner

The proponent will enter into rental agreements with the affected landowners for the use of the land for the establishment of the proposed REF. In terms of the rental agreement the affected landowner will be paid an annual amount dependent upon the number of wind turbines located on the property. The additional income will reduce the risk to his livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as fuel, feed etc. Given the low carrying capacity of the veld the additional income represents a significant benefit for the affected landowner.

Table 4.10: Assessment of benefits associated with income generated for the affected farmer(s)

<p>Nature: The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc.</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Generation of additional income for affected landowners	<p><u>Direct impacts:</u></p> <ul style="list-style-type: none"> » Additional income to support farming <p><u>Indirect impacts:</u></p> <ul style="list-style-type: none"> » Opportunity to invest and expand farming operations and create more employment opportunities on the farm. 	Local	N/A
<p>Description of expected significance of impact</p> <p>Evidence from the other renewable energy projects indicates that the generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc.</p>			
<p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> » Collection of information on existing farming operations and activities. <p>Recommendations with regards to general field surveys</p> <ul style="list-style-type: none"> » Site visit and interviews with local farmers and representatives from local farming associations etc. 			

4.4.4 Benefits associated with the socio-economic development contributions

The REIPPPP has been designed not only to procure energy but has also been structured to contribute to the broader national development objectives of job creation, social upliftment and broadening of economic ownership. Socio-economic development (SED) contributions are an important focus of the REIPPPP and are aimed at ensuring that local communities benefit directly from the investments attracted into the area. These contributions are linked to Community Trusts and accrue over the project operation life and, in so doing, create an opportunity to generate a steady revenue stream over an extended period. This revenue can be used to fund development initiatives in the area and support the local community. The long-term duration of the revenue stream also allows local municipalities and communities to undertake long term planning for the area.

Table 4.11: Assessment of benefits associated with socio-economic development contributions

Nature: Benefits associated with support for local community's form SED contributions			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Support for local economic development and investment	<u>Direct impacts:</u> » Support local economic development » Create employment opportunities » Create skills development and training opportunities » Improve basic services <u>Indirect impacts:</u> » Up-grade local municipalities and improve quality of life of local communities	Local-Regional	N/A
Description of expected significance of impact The revenue from the proposed WEF can be used to support a number of social and economic initiatives in the area, including: <ul style="list-style-type: none"> • Creation of jobs. • Education. • Support for and provision of basic services. • School feeding schemes. • Training and skills development. • Support for SMME's. 			
Gaps in knowledge & recommendations for further study » Collection and review of information on REIPPPP.			
Recommendations with regards to general field surveys » N/A. Desktop review of REIPPPP.			

4.4.5 Visual impact and impact on sense of place

The proposed REF has the potential to impact on the areas existing rural sense of place. Based on an initial assessment of the location the potential impact on the areas sense of place is likely to be limited. This will be confirmed during the assessment phase and the findings of the Visual Impact Assessment (VIA).

Table 4.12: Visual impact and impact on sense of place

Nature: Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impact on rural sense of place	<u>Direct impacts:</u> » Change in rural sense of place <u>Indirect impacts:</u> » Potential impact on property values and hospitality operations.	Local	N/A
Description of expected significance of impact Renewable energy projects do have the potential to impact on an areas sense of place. In some instances, this can impact on existing or proposed tourist facilities and also on property values. In other cases local landowners have indicated that the potential visual impacts are not regarded as an issue.			
Gaps in knowledge & recommendations for further study » Collection of information on location of existing farming and hospitality operations and activities.			
Recommendations with regards to general field surveys » Site visit and interviews with local farmers and representatives from local municipality and farming and hospitality associations etc.			

4.4.6 Potential impact on property values

The potential visual impacts associated with the proposed REF have the potential to impact on property values. Based on the results of a literature review undertaken for other REFs the potential impact on property values in rural areas is likely to be limited. A study undertaken in Australia in 2016 (Urbis Pty Ltd) found that:

- Appropriately located wind farms within rural areas, removed from higher density residential areas, are unlikely to have a measurable negative impact on surrounding land values.
- There is limited available sales data to make a conclusive finding relating to value impacts on residential or lifestyle properties located close to wind farm turbines, noting that wind farms in NSW have been constructed in predominantly rural areas.

These results will be confirmed based on the findings of the site visit and the VIA.

Table 4.13: Assessment of potential impact on property values and operations

Nature: Potential impact of the REF on property values. This is usually linked to the visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impact on rural sense of place and associated impact on property values.	<u>Direct impacts:</u> » Change in rural sense of place and impact on property values <u>Indirect impacts:</u> » Potential impact on	Local	N/A

	hospitality operations.		
Description of expected significance of impact			
Renewable energy projects do have the potential to impact on an areas sense of place. In some instances, this can impact on property values. In other cases, local landowners have indicated that the potential visual impacts and impact on property values are not regarded as an issue.			
Gaps in knowledge & recommendations for further study			
» Collection of information on location of existing farming and hospitality operations and activities.			
Recommendations with regards to general field surveys			
» Site visit and interviews with local farmers and representatives from local municipality and farming and hospitality associations etc.			

4.4.7 Potential impact on tourism

The potential visual impacts associated with the proposed REF have the potential to impact on tourism facilities and tourism in the area. Based on the findings of the literature review there is limited evidence to suggest that the proposed WEF would impact on the tourism in the PKSDM and ULM at a local and regional level. The findings will be confirmed during the Assessment Phase.

Table 4.14: Impact on tourism in the region

Nature: Potential impact of REF on local tourism. This is usually linked to the visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impact on existing and future tourism operations.	<u>Direct impacts:</u> » Change in rural sense of place and impact on tourism activities. <u>Indirect impacts:</u> » Potential impact on future development of hospitality operations.	Local	N/A
Description of expected significance of impact			
Renewable energy projects do have the potential to impact on an areas sense of place. In some instances, this can impact on tourism activities. In other cases, local landowners have indicated that the potential visual impacts and impact on tourism activities are not regarded as an issue.			
Gaps in knowledge & recommendations for further study			
» Collection of information on location of existing farming and hospitality operations and activities.			
Recommendations with regards to general field surveys			
» Site visit and interviews with local farmers and representatives from local municipality and farming and hospitality associations etc.			

4.5 CUMULATIVE IMPACT ON SENSE OF PLACE

The potential cumulative impacts on the areas sense of place will be largely linked to potential visual impacts. In this regard the Scottish Natural Heritage (2005) describes a range of potential cumulative landscape impacts associated with wind farms on landscapes. These issues are also likely to be relevant to solar facilities and associated infrastructure. The relevant issues identified by Scottish Natural Heritage study include:

- Combined visibility (whether two or more wind farms will be visible from one location).
- Sequential visibility (e.g. the effect of seeing two or more wind farms along a single journey, e.g. road or walking trail).
- The visual compatibility of different wind farms in the same vicinity.
- Perceived or actual change in land use across a character type or region.
- Loss of a characteristic element (e.g. viewing type or feature) across a character type caused by developments across that character type.

The guidelines also note that cumulative impacts need to be considered in relation to dynamic as well as static viewpoints. The experience of driving along a tourist road, for example, needs to be considered as a dynamic sequence of views and visual impacts, not just as the cumulative impact of several developments on one location. The viewer may only see one renewable energy facility and the associated infrastructure at a time, but if each successive stretch of the road is dominated by views of renewable energy facilities, then that can be argued to be a cumulative visual impact (National Wind Farm Development Guidelines, DRAFT - July 2010).

As indicated above, the potential impact of the proposed REF and associated infrastructure on the areas sense of place is likely to be limited. The cumulative impacts are also likely to be low with mitigation. This will be confirmed during the assessment phase.

Table 4.15: Cumulative impacts on sense of place and the landscape

Nature: Visual impacts associated with the establishment of more than one REF and the potential impact on the area's rural sense of place and character of the landscape.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Cumulative impact on rural sense of place	<u>Direct impacts:</u> » Change in rural sense of place <u>Indirect impacts:</u> » Potential impact on property values and hospitality operations.	Local-Regional	N/A
Description of expected significance of impact			
The establishment of renewable energy projects do have the potential to have a cumulative impact on an areas sense of place. The significance will depend on the location and number of REFs proposed. This will be informed by the findings from the site visit and review of the VIA.			
Gaps in knowledge & recommendations for further study			
» Collection of information on location of existing farming and hospitality operations and activities.			
Recommendations with regards to general field surveys			
» Site visit and interviews with local farmers and representatives from local municipality and farming and hospitality associations etc.			

4.6 CUMULATIVE IMPACT ON LOCAL SERVICES AND ACCOMMODATION

The establishment of a number of REFs has the potential to place pressure on local services and accommodation, specifically during the construction phase. The objective will be to source as many low and semi-skilled workers for the construction phase from the ULM. This will reduce the pressure on local services and accommodation and the

nearby towns of Victoria West and Richmond. The capacity of accommodate workers will be addressed during the assessment phase.

The potential impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of the proposed facility and associated renewable energy projects in the ULM. These benefits will create opportunities for investment in the ULM, including the opportunity to upgrade and expand existing services and the construction of new houses.

Table 4.16: Cumulative impacts on local services

Nature: The establishment of a number of renewable energy facilities and associated projects, such as the proposed WEF, in the ULM has the potential to place pressure on local services, specifically medical, education and accommodation			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Cumulative impact on local services, including accommodation, medical and emergency services	<u>Direct impacts:</u> » Pressure on available services (medial, emergency etc.) » Pressure on available accommodation. <u>Indirect impacts:</u> » Potential impact on rentals and cost of services.	Local-Regional	N/A
Description of expected significance of impact The establishment of renewable energy projects do have the potential to have a cumulative impact on local services, specifically accommodation and emergency services. The significance will depend on the number of REFs proposed and timing of construction.			
Gaps in knowledge & recommendations for further study » Collection of information on number REFs proposed and timing of construction phase.			
Recommendations with regards to general field surveys » Site visit and interviews with local municipal officials and representatives from hospitality associations etc.			

4.7 CUMULATIVE IMPACT ON LOCAL ECONOMY

In addition to the potential negative impacts, the establishment of renewable energy facilities and associated infrastructure, including the proposed WEF, will also create several socio-economic opportunities for the ULM. The positive cumulative opportunities include creation of employment, skills development and training opportunities, and downstream business opportunities.

The review of the REIPPPP (June 2020) indicates that the SED contributions associated with 68 operational projects has amounted to R 1.2 billion to date. In terms of Enterprise Development (ED), R 7.2 billion has been committed for BW1 to BW4, 1S2 and 2S2. Assuming an equal distribution of revenue over the 20-year project operational life, enterprise development contributions would be R360 million per annum. Of the total commitment, R5.6 billion is specifically committed directly within the local communities where the IPPs operate, contributing significantly to local enterprise development. Up until the end of June 2020 a total of R 384.2 million had already been made to the local communities located in the vicinity of the 68 operating

IPPs. This represents 93% of the total R384.2 million enterprise development contributions made to date).

The potential cumulative benefits for the local and regional economy are therefore associated with both the construction and operational phase of renewable energy projects and associated infrastructure and extend over a period of 20-25 years. However, steps must be taken to maximise employment opportunities for members from the local communities in the area and support skills development and training programmes.

Table 4.17: Cumulative impacts on local economy

Nature: The establishment of renewable energy facilities and associated projects, such as the WEF, in the ULM will create employment, skills development and training opportunities, creation of downstream business opportunities.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Cumulative benefits in terms of creating employment, business, and skills development opportunities for the local municipality	<u>Direct impacts:</u> » Creation of employment, business, and skills development opportunities for the local municipality <u>Indirect impacts:</u> » Support local economic development.	Local-Regional	N/A
Description of expected significance of impact The establishment of renewable energy projects do have the potential to create benefits in terms of creating employment, business, and skills development opportunities for the local municipality. The significance will depend on the number of REFs proposed and timing of construction.			
Gaps in knowledge & recommendations for further study » Collection of information on number REFs proposed and timing of construction phase.			
Recommendations with regards to general field surveys » Site visit and interviews with local municipal officials and representatives from hospitality associations etc.			

4.8 ASSESSMENT OF NO-DEVELOPMENT OPTION

The primary goal of the Project is to assist in providing additional capacity to Eskom to assist in addressing the current energy supply constraints. The project also aims to reduce the carbon footprint associated with energy generation. As indicated above, energy supply constraints and the associated load shedding have had a significant impact on the economic development of the South African economy. South Africa also relies on coal-powered energy to meet more than 90% of its energy needs. South Africa is therefore one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions.

The No-Development option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with clean, renewable energy. Given South Africa's current energy security challenges and its position as one of the highest per capita producers of carbon emissions in the world, this would represent a significant negative social cost.

Table 4.18: Assessment of no-development option

Nature: The no-development option would result in the lost opportunity for South Africa to improve energy security and assist to support with the development of clean, renewable energy.			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Lost opportunity to improve energy security and develop clean, renewable energy	<u>Direct impacts:</u> » Energy security » Creation of employment, business, and skills development opportunities for the local municipality <u>Indirect impacts:</u> » Address climate change.	Local-Regional	N/A
Description of expected significance of impact The establishment of renewable energy projects will improve energy security and create benefits in terms of creating employment, business, and skills development opportunities. These benefits would be foregone if the REF is not developed.			
Gaps in knowledge & recommendations for further study » Collection and review of information on REIPPPP.			
Recommendations with regards to general field surveys » N/A. Desktop review of REIPPPP.			

4.9 PLAN OF STUDY FOR SIA

The proposed approach to the SIA is based on the Guidelines for SIA endorsed by Western Cape Provincial Environmental Authorities (DEA&DP) in 2007. The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, 1994) and IAIA Guidance for Assessing and Managing Social Impacts (2015). The approach to the study will involve:

- Collection and review of reports and baseline socio-economic data on the area. This includes socio-economic characteristics of the affected areas, current and future land uses, and land uses planning documents relating to the study area and surrounds.
- Identification of the components associated with the construction and operational phase of the proposed project, including estimate of total capital expenditure, number of employment opportunities created and breakdown of the employment opportunities in terms of skill levels (low, medium and high skilled), breakdown of wages per skill level, assessment procurement policies etc.;
- Site visit and interviews with key affected parties, including local communities, local landowners, key government officials (local and regional), the client, local farmers associations, tourism and conservation officials, chamber of commerce etc.
- Review of key findings of the key specialist studies that have a bearing on the SIA, such as the Visual Impact Assessment (VIA). This information will also be used to inform the engagement with the affected landowners.
- Identification and assessment of key social issues and assessment of potential impacts (negative and positive) associated with the construction, operational and decommissioning phase of the project.
- Identification and assessment of cumulative impacts (positive and negative).

- Identification of appropriate measures to avoid, mitigate, enhance and compensate for potential social impacts.
- Preparation of Social Impact Assessment (SIA) Report.

The site visit will be undertaken during the Assessment Phase of the SIA. The site visit will include interviews with key stakeholders and interested and affected parties.

ANNEXURE A

REFERENCES

- The National Energy Act (2008).
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998).
- The White Paper on Renewable Energy (November 2003).
- Integrated Resource Plan (IRP) for South Africa (2010-2030).
- The National Development Plan (2011).
- Northern Cape Provincial Growth and Development Strategy (2004-2014).
- Northern Cape Climate Change Response Strategy.
- Northern Cape Spatial Development Framework (2012).
- Northern Cape Province Green Document (2017/2018).
- Pixley Ka Seme Integrated Development Plan (2019-2020).
- Pixley Ka Seme Spatial Development Framework (2017).
- Green Jobs Study (2011), IDC, DBSA Ltd and TIPS.
- Independent Power Producers Procurement Programme (IPPPP): An Overview (2017), Department of Energy, National Treasury and DBSA.
- Powering the Future: Renewable Energy Roll-out in South Africa (2013), Greenpeace South Africa.
- Ubuntu Integrated Development Plan (2019-2020).

ANNEXURE B: ASSESSMENT METHODOLOGY

METHODOLOGY FOR THE ASSESSMENT OF POTENTIAL IMPACTS

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified will be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, where it will be indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score between 1 and 5 will be assigned as appropriate (with a score of 1 being low and a score of 5 being high).
- The **duration**, where it will be indicated whether:
 - * the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - * the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
 - * medium-term (5–15 years) – assigned a score of 3;
 - * long term (> 15 years) - assigned a score of 4; or
 - * permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
 - * 0 is small and will have no effect on the environment;
 - * 2 is minor and will not result in an impact on processes;
 - * 4 is low and will cause a slight impact on processes;
 - * 6 is moderate and will result in processes continuing but in a modified way;
 - * 8 is high (processes are altered to the extent that they temporarily cease); and
 - * 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
 - * Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
 - * Assigned a score of 2 is improbable (some possibility, but low likelihood);
 - * Assigned a score of 3 is probable (distinct possibility);
 - * Assigned a score of 4 is highly probable (most likely); and
 - * Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- The **status**, which will be described as either positive, negative or neutral.
- The *degree* to which the impact can be *reversed*.
- The *degree* to which the impact may cause *irreplaceable loss of resources*.
- The *degree* to which the impact can be *mitigated*.

The **significance** is determined by combining the criteria in the following formula:

$S=(E+D+M)P$; where

S = Significance weighting

E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

ANNEXURE C: CV

Tony Barbour

ENVIRONMENTAL CONSULTING AND RESEARCH

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Tony Barbour's has 26 years' experience in the field of environmental consulting and management. His experience includes working for ten years as a consultant in the private sector followed by four years at the University of Cape Town's Environmental Evaluation Unit. He has worked as an independent consultant since 2004, with a key focus on Social Impact Assessment. His other areas of interest include Strategic Environmental Assessment and review work.

EDUCATION

- BSc (Geology and Economics) Rhodes (1984);
- B Economics (Honours) Rhodes (1985);
- MSc (Environmental Science), University of Cape Town (1992)

EMPLOYMENT RECORD

- Independent Consultant: November 2004 – current;
- University of Cape Town: August 1996-October 2004: Environmental Evaluation Unit (EEU), University of Cape Town. Senior Environmental Consultant and Researcher;
- Private sector: 1991-August 2000: 1991-1996: Ninham Shand Consulting (Now Aurecon, Cape Town). Senior Environmental Scientist; 1996-August 2000: Steffen, Robertson and Kirsten (SRK Consulting) – Associate Director, Manager Environmental Section, SRK Cape Town.

LECTURING

- University of Cape Town: Resource Economics; SEA and EIA (1991-2004);
- University of Cape Town: Social Impact Assessment (2004-current);
- Cape Technikon: Resource Economics and Waste Management (1994-1998);
- Peninsula Technikon: Resource Economics and Waste Management (1996-1998).

RELEVANT EXPERIENCE AND EXPERTISE

Tony Barbour has undertaken in the region of 260 SIA's, including SIA's for infrastructure projects, dams, pipelines, and roads. All of the SIAs include interacting with and liaising with affected communities. In addition, he is the author of the Guidelines for undertaking SIA's as part of the EIA process commissioned by the Western Cape Provincial Environmental Authorities in 2007. These guidelines have been used throughout South Africa.

Tony was also the project manager for a study commissioned in 2005 by the then South African Department of Water Affairs and Forestry for the development of a Social Assessment and Development Framework. The aim of the framework was to enable the Department of Water Affairs and Forestry to identify, assess and manage social impacts associated with large infrastructure projects, such as dams. The study also included the development of guidelines for Social Impact Assessment, Conflict Management, Relocation and Resettlement and Monitoring and Evaluation.

Countries with work experience include South Africa, Namibia, Angola, Botswana, Zambia, Lesotho, Swaziland, Ghana, Senegal, Nigeria, Mozambique, Mauritius, Kenya, Ethiopia, Oman, South Sudan, Sudan and Armenia.

ANNEXURE D: DECLARATION OF INDEPENDENCE

The specialist declaration of independence in terms of the Regulations_

I, Tony Barbour , declare that --

General declaration:

I act as the independent specialist in this application;

I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;

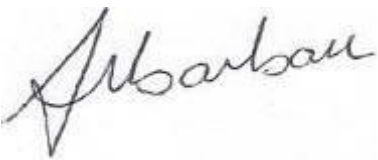
I will comply with the Act, Regulations and all other applicable legislation;

I have no, and will not engage in, conflicting interests in the undertaking of the activity;

I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

all the particulars furnished by me in this form are true and correct;
and

I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the specialist:

Tony Barbour Environmental Consulting and Research

Name of company (if applicable):

26 October 2021

Date: